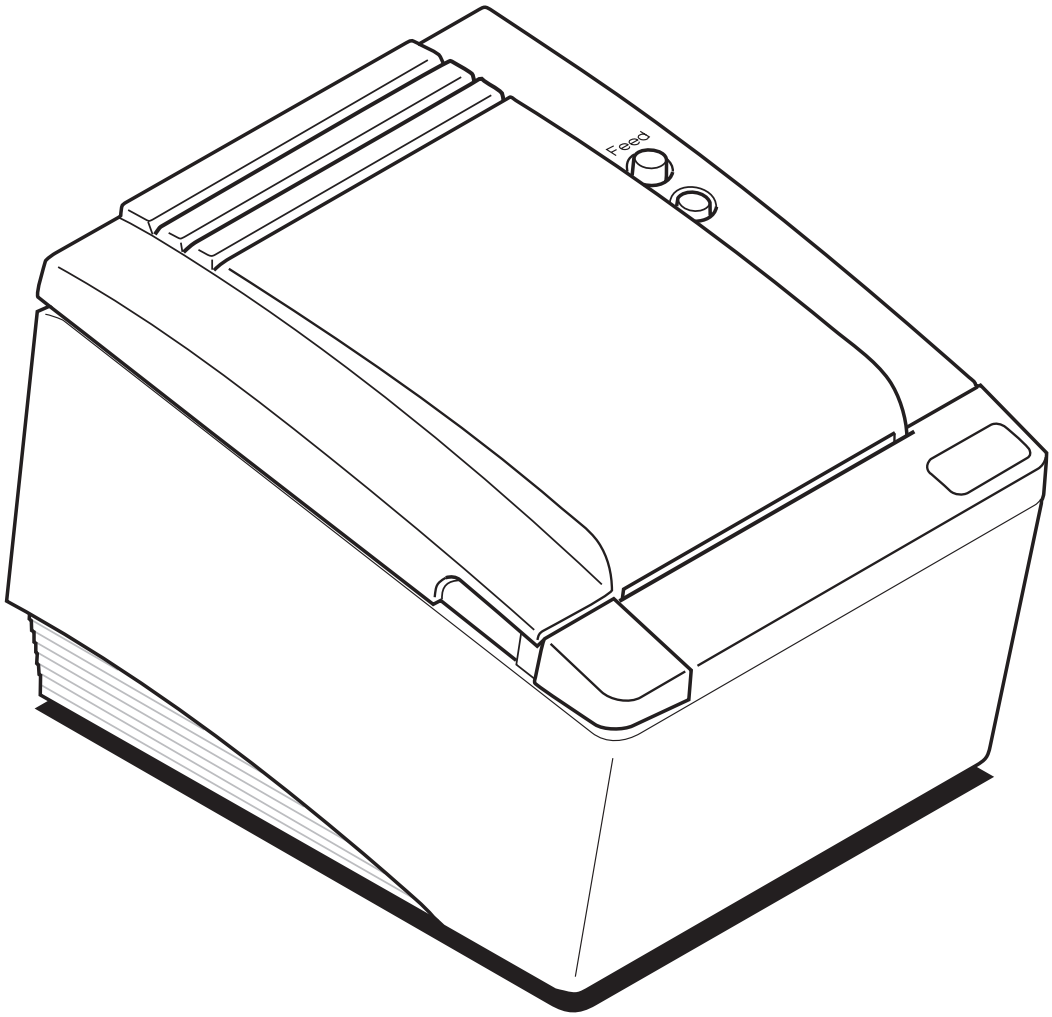
OKIPOS 80 + iii

Programmer's Guide



People to People Technology

Rev A Copyright Oki Europe Limited 1999

Change History

Rev. A Initial Release

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Federal Communications Commission Radio Frequency Interference Statement

FCC CLASS A

FCC Compliance Statement

For American Users

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

FOR CANADIAN USERS

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigenves du Règlement sur le matériel brouileur du Canada.

DECLARATION OF CONFORMITY

Product Name: Thermal Printer
Type Name: Series 80

These printers conform to the following Directives and Norms

Directive 89/336/EEC
EN 55022 (1995) /A1 (1995)
EN 50082-1 (1992)
IEC 801-2 (1991)
IEC 801-3 (1984)
IEC 801-4 (1991)

Directive 90/384/EEC
EN 45501: (1992)

EMI and SAFETY STANDARDS APPLIED

The following standards are applied only to the printers that are so labeled. (EMC is tested using the Oki Bestec BPA-601-24-1984

Europe: CE marking
EN55022 (1995)
EN50082-1 (1992)
EN45501 (1992)

Safety Standard: TÜV EN 60950 (1992)

North America:
EMI: FFC Class A
Safety Standards: UL 1950, 3rd Edition (1995)
CAN/CSA-C22.2 No. 950-95, 3rd Edition (1995)

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Chapter 1:
General Information

Service Information

The printer may be serviced by a dealer, an independent service contractor, or by Oki. If the unit requires service, contact your OKIPOS dealer or local country Oki Office – Locatable via WWW.OKIEUROPE.COM

The printer may need to be packed in the original packing material and box.

What is in this book?

Who should read this book?

This book is intended for system engineers or system integrators. It contains the information needed to integrate the OKIPOS 80 Plus III Printer with a point-of-sale terminal and to program the terminal to communicate with the printer.

Where can you find more information?

An Operator's Guide is available that describes setup and use of the OKIPOS 80 Plus III Printer. It describes basic procedures such as changing paper; printing on a form; and replacing the ribbon cassette. A Maintenance Manual is also available; however, it is intended for trained, service technicians.

For information about ordering these books or programs, refer to the next section.

Contacting Oki

The Sales and Technical Support Departments will be able to help you with most of your questions.

Contact the Sales Department to order documentation, receive additional information about the OKIPOS 80 Plus III Printer, order supplies, or obtain information about other products by Oki.

Contact the Technical Support Department if you would like information about your warranty or if you need to send a printer in for service.

Internet Support

Oki Europe offers support for printers and contact details/websites of all subsidiary companies via WWW.OKIEUROPE.COM

General Description

Features

The OKIPOS 80 Plus III Printer is a high-quality POS printer that can print on a thermal paper roll. The printer has the following features.

Printing

- High-speed printing: approximately 31.8 lines/second (1/6 inch feed).
- Low-noise thermal printing
- 72-mm/2.83-inch print zone
- Dual cash draw drivers with status
- Centronics parallel IEEE 1284 nibble, byte mode or RS-232C interface
- Configurable receive, and image buffer areas

Software

- Command protocol is based on the Ithaca Standard with selectable Epson of Axiohm emulations.
- Characters can be scaled up to 8 times as large as the standard size.
- Bar code printing is possible by using a command code. Bar codes can be printed in the vertical direction.
- Repeated operation and copy printing are possible by using graphic save.
- Character font size (13 x 24 font or 10 x 24 font) is used to produce 10, 12, 15, 17, and 20 cpi print.
- All-points-addressable (APA) graphics are supported in ten different resolutions.
- Custom graphic/user save area is located in nonvolatile memory.
- Self-diagnostics are included.

Printer Handling

- Paper roll loading is easy.
- An auto-cutter is standard.
- The printer allows easy maintenance for tasks such as head cleaning.
- The built-in interface provides control capability for two cash drawers.

Interface Specifications

Serial

The serial interface is a standard RS-232 interface on a 9-pin D-shell connector. It is defined as a standard DTE device. A null model cable is required to interface the printer to another DTE device (a PC). See the serial port description contained in the communications area later in this manual for more information.

Parallel

The parallel port is a standard 25-pin D-shell as defined in the IEEE 1284-A Standard. See the parallel port description contained in the communications area later in this manual for more information.

Cash Drawer

The OKIPOS 80 Plus III Printer supports dual cash drawers with status. The interface will provide status and 24 VDC up to 1.25 amps to the cash drawer. See the cash drawer interface description later in this manual.

Chapter 2:
Setting up the Printer

Up to four cables can be connected to the printer, providing power, host interface, and cash drawer support. They attach to the connector panel on the back of the printer, as shown below.

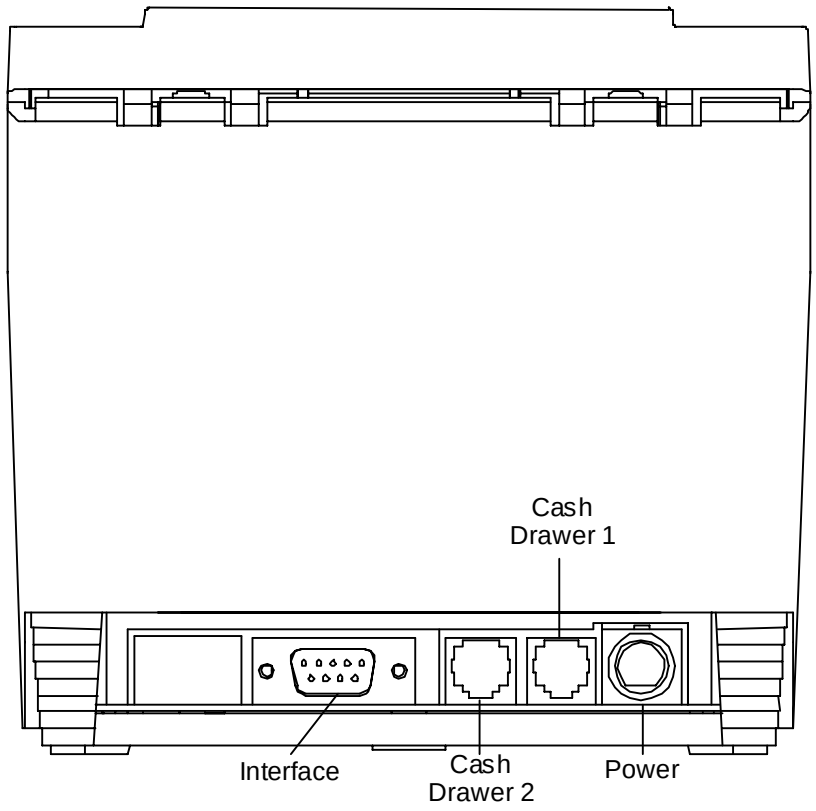


Figure 1 Connector Panel

Connecting the Printer and Computer

You need an appropriate interface cable. The parallel interface requires a straight through 25-pin connector, with male termination on the printer end, see the interface section for complete pin definition details. The serial interface requires a DB25- to DB9-pin or DB9- to DB9-pin null modem crossover cable, with a DB9-pin female terminal on the printer end, and the appropriate gender connector at the host computer end. See the communication section for complete pin definition details.

1. Plug the cable connector securely into the printer's interface connector.
2. Tighten the screws on both sides of the cable connector.
3. Attach the other end of the cable to the appropriate terminal on the computer.

Connecting the Cash Drawer

The cash drawer option allows up to two cash drawers to be connected to the printer in a system with a PC that has no connectors for the cash drawer cables.

The cash drawers are operated by software command from the host system through the printer. For additional information on the printer commands used by the host system to activate the cash drawers, see "Control Code Library" later in this manual.

1. Plug the cash drawer cables into the connectors on the printer. The connectors are standard phone connectors.
2. If only one cash drawer is used, plug the cable into the connector labeled 1.

NOTE: The following illustration shows the pin outs for the cash drawer connectors, as viewed from the rear of the unit. Drawer #2 can be configured to be the same as #1 via jumper J-7.

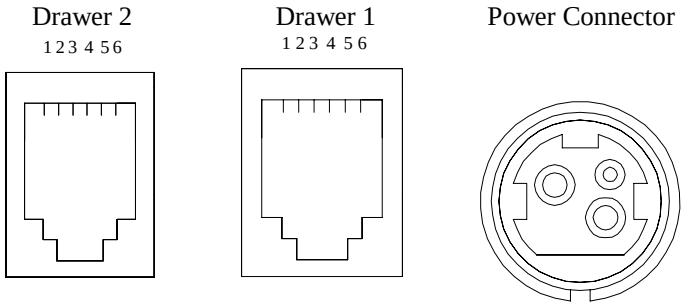


Figure 2 Pin outs for cash drawer connectors

Cash Drawer	J7 3-4* Pin #	J7 1-2* Pin #	Epson/Axiohm
1	1	1	Frame Ground
	2	2	Drawer Drive - (Ground)
	3	3	Status Switch +
	4	4	Drawer Drive + (24V Switched)
	5		Drawer Drive - (Ground)
		5	No Connect
	6	6	Status Switch - (Ground)
2	1	1	Frame Ground
	2		No Connect
		2	Drawer Drive - (Ground)
	3	3	Status Switch +
	4	4	Drawer Drive + (24V Switched)
	5	5	Drawer Drive - (Ground)
	6	6	Status Switch - (Ground)

Table 1

*This jumper is for compatibility with earlier Epson printers. Pins 3-4 are the default configuration for these jumpers.

WARNING:
Use a drawer that matches the printer's specification. Using an improper drawer may damage the drawer as well as the printer.

CAUTION:
Do not connect a telephone line to the drawer kick-out connector; otherwise the printer and the telephone line may be damaged.

Connecting the Power Supply

Use the optional Oki Bestec BPA-601-24-1984 or equivalent power supply for your printer. The following illustration shows the power cable connector and pin assignments. The power cable connector is a 3-pin mini-DIN plug and is located in the small cavity under the printer.

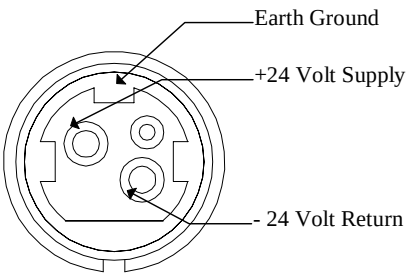


Figure 3 Power cable connector

WARNING:
Make sure that you use the Oki Bestec BPA-601-24-1984 power supply or equivalent. Using an incorrect power supply may cause fire or electrical shock.

CAUTIONS:
If the power supply's rated voltage and your outlet's voltage do not match, contact your dealer for assistance. Do not plug in the power cord. Otherwise, you may damage the power supply or the printer.

Make sure that the power supply's power cord is unplugged from the electrical outlet.

Check the label on the power supply to make sure that the voltage required by the power supply matches that of your electrical outlet.

Plug in the power supply's cable as shown below. Notice that the flat side of the plug faces up.

NOTE: To remove the DC cable connector, grasp the connector at the arrow, and pull it straight out.

INSTALLING OR REPLACING THE PAPER ROLL

NOTE: Be sure to use paper rolls that meet specifications.

1. Make sure that the printer is in the idle state.
2. Open the paper roll cover by pressing the cover open button located in the forward corner of the printer cover.
3. Remove the used paper roll core if there is one.
4. Insert the paper roll with the shiny side facing down.
5. Assure that a small amount of paper extends over the front side of the printer. Then close the cover until it locks into place.
6. Depress the paper feed button to activate the vertical motor, and toss out the scrap paper. Units with a cutter will automatically cut the paper off for you, if your printer does not have a mechanical cutter, simply tear the paper off by pulling it against the printer cover at an angle.

Chapter 3:
Self-test Mode

Description

The OKIPOS 80 Plus III thermal printer has the ability to print self-test tickets on power-up upon command. The self-test prints a variety of information about the printer's operating settings and configuration. The information provided by the self-test is listed below.

Configuration Ticket

- Operating system type and version
- Current emulation mode (M50, M80PLUS, Epson TM-T8x, or Axiohm 7193)
- Interface configuration
- Hex-dump mode status (ON/OFF)
- Carriage return control
- Input buffer capacity
- Graphic save RAM buffer capacity
- Nonvolatile EEPROM buffer capacity (bit-image, character set in Epson/Axiohm)
  Contents of the EEPROM save buffer (bit-image, character set in Epson/Axiohm)
  Start-up macro definition status (YES/NO)
- Additional information
  Auto-cutter (Enabled/Disabled)

Print Tickets

The configuration ticket is followed by several print examples that test the various features of the printer.

Chapter 4:
Configuration Mode

Description

The OKIPOS 80 Plus III thermal printer has many options and features that are user configurable. Unlike most printers that use dip switches to control these settings, the OKIPOS 80 Plus III Printer has been equipped with an automated configuration mode. By powering the OKIPOS 80 Plus III Printer in a special sequence, it will enter configuration mode. In this mode, the printer's current settings are printed one at a time. By pressing the FEED button, the printer cycles through the remaining available settings for that option. When the setting for the item you desire has been selected, waiting five seconds will cause the printer to move on to the next option that you can change. When all options have been exhausted, the OKIPOS 80 Plus III Printer writes them permanently to its nonvolatile EEPROM memory and resets itself. See Configuration Options for an ordered list of options and their associated settings.

Entering Configuration Mode

Follow the steps below to enter the configuration mode:

1. Power the printer off if it is not already off.
2. Open the cover.
3. Power the printer on while holding down the FEED button.
4. Wait until the status LED blinks a cover open condition. (See Appendix B).
5. Release the FEED button.
6. Load the printer with paper if it is not already loaded.
7. Close the cover.
8. The OKIPOS 80 Plus III Printer will print a few lines of instructions followed by:

   Press PAPER FEED to begin
9. If the FEED button is not pressed within five seconds, the printer will exit the configuration mode without making any changes and reset.
10. If the FEED button is pressed, the printer will start the configuration mode by displaying the first option and its setting. See Configuration Options for an ordered list of options and their associated settings.
11. At this time you may,
    A) Press the FEED button to cycle through the choices for this option or
    B) Wait five seconds to continue to the next option.
12. Repeat Step 11 until the last option has been completed.
13. The OKIPOS 80 Plus III Printer will print a message indicating it is exiting the configuration mode and will save the settings exactly as they have been presented/changed.

If the OKIPOS 80 Plus III Printer is powered off at any time during the configuration mode, no changes will be saved.

The initial setting displayed with each option reflects the current configuration. If you do not wish to change a setting, simply wait five seconds to continue to the next option.

The printer does not have to be hooked up to a host computer to use the configuration mode.

Configuration Options

The tables below depict the options, in order, presented by the configuration mode. Each option shows the settings available, as well as the default setting where applicable.

Hex Dump Mode	
Disabled (default)	
Enabled	If hex dump is enabled, the remainder of the configuration process will be skipped. The printer will then enter hex dump mode. The printer will remain in hex dump until it is reset or power cycled.
Emulation Mode	
M80PLUS	Normal Ithaca M80PLUS Mode (IBM like)
M50	Ithaca M50 Emulation
Epson TM85	Epson TM85 Emulation
Epson TM88	Epson TM88 Emulation
Axiohm	Axiohm 7193 Emulation
Carriage Return (CR) Control	
Normal return (default)	Perform a normal CR by returning the input pointer to the left margin; overprint allowed.
Line feed	Translate CR's into LF's
Ignore carriage return	Ignore all CR's; only line feed operations result in print
Language Set/Code Page	
Selects the default language set/code page depending upon the selected emulation mode.	
EURO Substitution	
Enabled	Enable Euro character substitution in select code pages. *See Table A below.*
Disabled	
Auto Cutter Option	
Enabled	
Disabled	
Input Buffer Size	
45 bytes	
8192 bytes (default)	
16384 bytes	
24576 bytes	
32768 bytes	
User Definable Buffer Size	
14 KB	RAM buffer storage for user definable character sets and images.
20 KB (default)	1 KB = 1024 bytes
26 KB	
32 KB	
38 KB	
Graphic Buffering	
Enabled (default)	The printer will print multiple lines of graphics at the same time. Start/stop printing will be less noticeable during large images.
Disabled	The printer will print graphics a line at a time.

For printers equipped with an RS-232 serial communications interface			
Baud Rate			
38400 BPS	19200 BPS	9600 BPS (default)	4800 BPS
Data bits, Parity, Stop Bits			
8,none,1 (default)	7,odd,1	7,even,1	8,none,2
8,odd,1	8,even,1		
Flow Control			
XON/XOFF		DTR/DSR	
CTS/RTS		CTS/RTS and DTR/DSR	
Data Receive Error			
Prints '?' (default)			
Ignored			
Serial Plug and Play			
Enabled (default)			
Disabled			

For printers equipped with an IEEE 1284 parallel communications interface	
IEEE 1284 nINIT Line Reset	
Enabled (default)	
Disabled	
IEEE 1284 nACK Signal Operation	
Mode 1	Not BUSY precedes ACK low.
Mode 2	Not BUSY follows ACK low.

TABLE A: Euro Character Substitution Matrix			
Name	**Epson**	**IBM**	**Code Page Insertion Point**
850	26	850	0xD5
Turkey 857	57	857	0xD5
Win Cyrillic	52	1022	0x88
Win Turkish	51	1021	0x80
Win Greek	50	1020	0x80
Win Hebrew	62	1032	0x80
Win Baltic	68	1034	0x80

Chapter 5:
Reference Information

Printing Specifications

Printing method	Thermal line printing
Dot density	8 dots/mm x 8 dots/mm (203 dpi x 203 dpi)
Printing direction	Unidirectional with friction feed
Printing width	72 mm (2.83 in.), 576 dot positions
Characters per line	28 to 57 depending on the selected pitch
Printing speed	Approximately 31.8 lines/second (1/6 inch feed, at 24 V, 20° C) Approximately 135 mm/second (approximately 5.3 in./second)

NOTES:
Print speed may be slower, depending on the data transmission speed and the combination of control commands.

The printer switches the mode of the printing speed automatically.

There may be variations in printing after switching the mode of the printing speed.

Paper feed speed	Approximately 135 mm/second (approximately 5.3 in./second) continuous printing
Line spacing (default)	Mode: 4.23 mm (1/6 in.) or 3.17 mm (1/8 in.) Programmable by control command.
Number of characters	Alphanumeric characters: 255 per code page International characters: 67 code pages
Character structure	Font A: 13 x 24 (including 2-dot spacing in horizontal) Font B: 10 x 24 (including 2-dot spacing in horizontal)

	Standard		Double-high		Double-wide		Double-wide/ Double-high	
	W x H (mm)	Cpl[1] Max	W x H (mm)	Cpl[1] Max	W x H (mm)	Cpl[1] Max	W x H (mm)	Cpl[1] Max
Font A 13 × 24	1.38 × 3.00 (.06" × .12")	44	1.63 × 6.00 (.06" × .24")	44	2.75 × 3.00 (.11" × .12")	22	2.75 × 6.00 (.11" × .24")	22
Font B 10 × 24	1.00 × 3.00 (.04" × .12")	57	1.00 × 6.00 (.04" × .24")	57	2.00 × 3.00 (.08" × .12")	28	2.00 × 6.00 (.08" × .24")	28

Table 2 Character Spacing in Epson and Axiohm Modes
[1]cpl = characters per line (Space between characters is not included. Characters can be scaled up to 64 times as large as the standard sizes.)

Selected cpi[1]	Actual cpi[1]	Font used	Cpl[2] single-wide	Cpl[2] double-wide[3]
10	10.1	A	28	14
12	11.9	A	33	16
15	15.6	A	44	22
17	16.9	B	48	24
20	20.3	B	57	28

Table 3 Character spacing in M80PLUS mode

[1]cpi = characters per inch

[2]cpl = characters per line

[3]Characters can be scaled double-high/double-wide with normal commands.

Paper Specifications

Paper roll (single-ply)

Maximum outside diameter 100 mm (4.0 in.)

Paper roll spool diameter

Inside 12 mm (0.47 in.)

Outside 18 mm (0.71 in.)

NOTE The paper must not be pasted to the paper roll spool.

Width 80 mm +0.0/-1.0 mm (3.15 in. + 0.0/-0.04 in.)

Thermal sensitive layer faces outward on roll.

Electrical Characteristics

Output power 48 watts maximum average

Supply voltage 24 VDC ± 3% at 2.0 amp maximum average

Amp maximum average 2.0

Peak current 4.5 A

Standby current 0.2 A

Line and load regulation ± 3% to ± 5% at peak load

Ripple 240 mV at full load

Overvoltage protection 35 VDV maximum

Reliability

MTBF: Mechanism 94,000 hours @ 12.5% ratio

Print head life 100 km; 100 million pulses

Environmental Conditions

Temperature

Operating 0° to 40°C (32° to 104°F)

Humidity

Operating 10% to 90% RH, noncondensing

Chapter 6:
Control Commands

Control Codes Overview

This programmer's guide is designed to help users of the OKIPOS 80 Plus III Printer develop applications. The OKIPOS 80 Plus III Printers are specialized point-of-sale (POS) printers that have several features not normally found on general-purpose printers. Because of these features, the OKIPOS 80 Plus III Printers have specialized codes to control these features. This programmer's guide documents the control codes with an emphasis on those codes that are unique to the OKIPOS 80 Plus III Printer.

All OKIPOS 80 Plus III Printers are available with both a serial or parallel interface. Both interfaces provide the same printer control[1] and use the same control codes.

Nomenclature

When describing control codes, there is often confusion as to whether the description is decimal, hex, or ASCII. To minimize this problem, this programmer's guide will use the following nomenclature when describing control code sequences:

[ ]	This encloses a control character and is a single 8-bit value as defined in the standard ASCII tables. The ASCII table in Appendix C lists all the control codes. An example would be [ESC] which would represent a 1BH or 26 Decimal.
< >	This encloses an 8-bit value in decimal format. The value will be from 0 to 255. An example would be <2> which would represent 02H or 2 Decimal.
<n>	This indicates a variable parameter. In this case, a variable parameter, n, can have a value from 0 to 255. The meaning of n is described and defined in the description of the command.
$<n_1>$ $<n_2>$	This indicates that there are two parameters, n_1 and n_2, where both have values from 0 to 255.
$<m_1>$ $<m_2>$	This an IPCL parameter consisting of two digits, where m_1 and m_2 are ASCII characters from 0 to 9. The values will be combined to form a value from 0 to 99. If m_3 is included, the parameter will be combined to form a value from 0 to 999. If two values are specified, there must be two bytes added to the IPCL code. In other words, if the command specifies $<m_1>$ $<m_2>$ and the desired value is 5, the value must be specified as 05.
x	All other characters in control strings represent ASCII characters. For example, [ESC] 1 represents 1BH followed by 31H.

[1]The serial and IEEE 1284 interfaces provide a few additional interface capabilities over a standard parallel interface. The parallel M80PLUS supports the IEEE 1284 interface and provides a bi-directional data path.

Emulation Modes and Available Commands

The OKIPOS 80 Plus III thermal printer is capable of emulating an Ithaca M50, Epson TM88 Series, Epson TM85, and Axiohm 7193 series printer, in addition to the native M80PLUS . The Ithaca M90 and M150 products are supersets/subsets of the M80PLUS. The current emulation mode can be obtained at any time by performing a self-test and may be changed at any time via the configuration mode.

Not all of the commands supported by the OKIPOS 80 Plus III Printer are available at all times.

Standard Emulation

The standard control codes for the OKIPOS 80 Plus III Printers are extensions and subsets of other Ithaca products. In some cases, an application designed for a Series 50 printer with IBM code sets will function with a OKIPOS 80 Plus III Printer in M50 emulation. There are, however, significant differences in the operation of the OKIPOS 80 Plus III Printer that may impact existing applications.

ESC/POS

The OKIPOS 80 Plus III Printer supports an ESC/POS emulation with Epson or Axiohm emulations. These commands are different from the commands and are documented in the Epson/Axiohm command section of this manual.

IPCL Codes

IPCL (Ithaca Printer Control Language) codes are designed to control a printer without using control characters (For example, characters less than 20H.) Not all commands are supported by IPCL codes. For the commands that are, the IPCL code is listed.

In rare cases, an IPCL code will interfere with the text that is to be printed. The IPCL translator can be disabled with an [ESC]y<4> command.

Chapter 7
Printer Control Codes

Print/Paper Motion

Low-level Paper Motion Control

Function	**Carriage return**
ASCII	[CR]
Hexadecimal	0DH
Decimal	<13>
IPCL	&%CR
Description	This command prints the contents of the print buffer (if any) and resets the next character print position to the left margin. A line feed is not performed unless auto-feed was active. The left margin is defined by the current print station, print rotation direction, and left margin command.

Function	**Line feed**
ASCII	[LF]
Hexadecimal	0AH
Decimal	<10>
IPCL	&%LF
Description	This command prints the contents of the buffer (if any) and advances paper one line at the current default line spacing. The next character print position is reset to the left margin.

Horizontal Motion Control

There are several commands that can control the horizontal position of characters. Many applications use space control to position fields. However, there is the ability to control character position with horizontal tab stops. This is done by using the horizontal tab, [HT], to move to those tab stops.

Function	**Horizontal tab**
ASCII	[HT]
Hexadecimal	09H
Decimal	<9>
IPCL	&%HT
Description	This command inserts spaces in the print buffer up to the next tab stop. The default tab locations are every eight spaces.

Function	**Set horizontal tab stops**
ASCII	[ESC] D <n_1> <n_2> <n_3> ... <n_i> 0
Hexadecimal	1BH 44H <n_1> <n_2> <n_3> ... <n_i> 00H
Decimal	<27><68><n_1> <n_2> <n_3> ... <n_i> <0>
IPCL	none
Description	This command sets tab stops at the character columns specified by <n>. The end of the settings is specified by a <0>. All previously set tabs will be cleared by this command. There is no restore defaults procedure other than to respecify the tabs. Column sizes are in accordance with the current character pitch. Setting tabs that are beyond the station width is possible. A [CR] will be inserted if the tab is used. Printing will begin at the home position. The power up default is every eight spaces, i.e., 9, 17, 25, and so on.

Function	**Reset horizontal tab stops**
ASCII	[ESC] R
Hexadecimal	1BH 52H
Decimal	<27><82>
IPCL	&%HV
Description	This command resets horizontal and vertical tab stops to power up configuration. The power up horizontal default is every eight spaces, i.e., 9, 17, 25, and so on. The vertical default is every line.

Function	**Set justification**	
ASCII	[ESC] a <n>	
Hexadecimal	1BH 61H <n>	
Decimal	<27><97><n>	
IPCL	&%JL, &%JC, &%JR	
Description	This command sets the horizontal justification. The print format of the printer can be right, center, or left justified. The value of <n> specifies the justification.	
Where <n>	0 = Left justified	&%JL
	1 = Center justified	&%JC
	2 = Right justified	&%JR
	8 = Left justified (No LF)	None
	9 = Center justified (No LF)	None
	10 = Right justified (No LF)	None

The power on default is left justified.

NOTE: Lines that have mixed size characters within the line cannot be centered. For example, a line with mixed single- and double-high characters cannot be centered. If a line of print is to be double-high and centered, the change to single-high must be done after the line terminator for the double-high line. For example, [ESC] W<3>Centered[ESC]W<0>[CR] will not print correctly because the printer assumes that more data will follow the [ESC]W<0>. This should be: [ESC]W<3>Centered[CR] [ESC]W<0>.

NOTE: The justify commands also effect graphics.

Vertical Motion Control

Function	**Fine line feed**
ASCII	[ESC] J <n>
Hexadecimal	1BH 4AH <n>
Decimal	<27> <74><n>
IPCL	&%FM <m_1> <m_2> <m_3>
Description	This command prints the contents of the buffer (if any) and performs a line feed of n/216 inch. This command does not change the default line spacing value. The next character print position is reset to the left margin if the Auto-CR mode is set. **EPOS NOTE:** In EPOS mode, this command performs line feeds in n/144-inch increments.

Function	**Set variable line space to n/216 inch**
ASCII	[ESC] 3 <n>
Hexadecimal	1BH 33H <n>
Decimal	<27><51><n>
IPCL	&%SV <m_1> <m_2><m_3>
Description	This command sets the default line spacing to n/216 inch. Set n = 1 to 255. This command sets the line feed spacing used by [LF] to values other than 1/8 or 7/72 inch. This command takes effect immediately as opposed to the [ESC] A <n> command. **EPOS NOTE:** Line spacing of n/144 is used.

Function	**Set line space 27/216 inch**
ASCII	[ESC] 0
Hexadecimal	1BH 30H
Decimal	<27><48>
IPCL	&%ST
Description	This command sets the default line spacing to 1/8 inch (27/216 inch). This is a standard 8 lines per inch line spacing. This is the default text line spacing at initial power-up. **EPOS NOTE:** In EPOS mode, this command sets 1/6-inch spacing or 6 lines per inch.

Function	**Set line space 21/216 inch or (7/72 inch)**
ASCII	[ESC] 1
Hexadecimal	1BH 31H
Decimal	<27><49>
IPCL	&%SG
Description	This command sets the default line spacing to 21/216 inch. This line spacing is for all-points-addressable (APA) graphics printing.

Function	**Set variable line space n/72 inch**
ASCII	[ESC] A <n>
Hexadecimal	1BH 41H <n>
Decimal	<27><65><n>
IPCL	none
Description	This command sets default line spacing to n/72 inch. Set n = 1 to 85. This line spacing does not take effect until enabled by the [ESC] 2 command. This command is provided to maintain backward compatibility with Series 50, OKIDATA, IBM, and other printers. It can also be used to print on preprinted forms.

Function	**Enable [ESC] A <n> line spacing**
ASCII	[ESC] 2
Hexadecimal	1BH 32H
Decimal	<27><50>
IPCL	none
Description	[ESC] 2 enables [ESC] A <n> line spacing. This is a companion to the [ESC] A <n> command and puts the specified line spacing into effect. It will remain in effect until another line spacing command is issued.

Function	**Feed <n> lines at current spacing**
ASCII	[ESC] d <n>
Hexadecimal	1BH 64H <n>
Decimal	<27><100> <n>
IPCL	&%FL <m_1> <m_2>
Description	This command prints the contents of the buffer (if any) and performs <n> line feeds at the current line spacing. This command does not change the default line spacing value. The next character print position is reset to the left margin. **NOTE:** The IPCL command will print from 00 to 99 lines. For example, if you wish to feed 12 lines, the IPCL command would be &%FL12.

Function	**Form feed**
ASCII	[FF]
Hexadecimal	0CH
Decimal	<12>
IPCL	&%FF
Description	This command performs a form feed to cut.

Function	**Begin auto line feed**
ASCII	[ESC] 5 <01>
Hexadecimal	1BH 35H 01h
Decimal	<27><53><01>
IPCL	&%MA
Description	This command sets auto line feed mode. **NOTE:** This overrides the configuration setting.

Function	**End auto line feed**
ASCII	[ESC] 5 <0>
Hexadecimal	1BH 35H 00H
Decimal	<27><53><0>
IPCL	&%CA
Description	This command ends auto line feed mode. **NOTE:** This command overrides the configuration setting.

International Character Sets and Code Pages

The OKIPOS 80 Plus III Printer supports 65 different international character sets. In IBM and EPOS printers, there have historically been two ways of selecting a character set. The oldest way is by use of character sets. This mode substituted international characters in the upper 128 characters of the standard character set to support different countries. As time passed, this approach became difficult to support. It became a problem for the application to match the characters displayed and the characters printed. To solve this problem, code pages were developed. The printer and display would use the same code page and the application would then display and print the same characters. IBM and EPOS defined new commands to select code pages and left the old commands in effect.

The OKIPOS 80 Plus III Printer supports international character sets as well as code pages. However, both methods are extended in the OKIPOS 80 Plus III . This is to allow the most flexibility for the application programmer.

The OKIPOS 80 Plus III Printer has extended the IBM code page selection command to allow character sets as well as normal IBM code pages to be selected.

All characters in code pages as well as character sets are addressed as 0 to 255. (Characters below 32 must be addressed with the [ESC]^<n> command.) Code pages may be changed at any time and are active for all features including rotated print.

As discussed above, there are two commands for language selection in IBM mode. The first is [ESC] ! which will select one of 19 international character sets. This command will not select all the possible sets and is provided for compatibility with older programs. The second is [ESC] [T which will select any of the code pages.

Function	**Select international character table set**
ASCII	[ESC] ! <n>
Hexadecimal	1BH 21H
Decimal	<27><33>
IPCL	&%CS<n>
Description	This command selects the international character set, <n>. In standard mode, the value of <n> is as follows.

<n>	Language	<n>	Language	<n>	Language
64-'@'	ASCII (Slashed zero)	71-'G'	Norwegian	78-'N'	Swedish IV
65-'A'	ASCII (Unslashed zero)	72-'H'	Dutch	79-'O'	Turkish
66-'B'	British	73-'I'	Italian	80-'P'	Swiss I
67-'C'	German	74-'J'	French Canadian	81-'Q'	Swiss II
68-'D'	French	75-'K'	Spanish	90-'Z'	Publisher
69-'E'	Swedish	76-'L'	Swedish II		
70-'F'	Danish	77 -'M'	Swedish III		

Table 4 Language table ID's

Function **Select character code page**

ASCII [ESC] [T <n_h> <n_l>

Hexadecimal 1BH 5BH 54H <n_h> <n_l>

Decimal <27><91><84><n_h> <n_l>

IPCL &%CP <m_1> <m_2><m_3><m_4>

Description This command selects character code page <n_h> <n_l>. The OKIPOS 80 Plus III Printer supports many code pages. The following code pages are supported.

Code Page	Country Code/ Language Set	Decimal <n_h> <n_l>	Hex <n_h> <n_l>	Code Page	Country Code/ Language Set	Decimal <n_h> <n_l>	Hex <n_h> <n_l>
64	USA (Slashed 0)	0,64	0H,040H	866	Cyrillic II-866	3,98	3H,062H
65	USA (Unslashed 0)	0,65	0H,041H	869	Greek 869	3,101	3H,065H
66	British	0,66	0H,042H	874	Thailand	3,106	3H,06AH
67	German	0,67	0H,043H	895	Kamenicky (MJK)	3,127	3H,07FH
68	French	0,68	0H,044H	1008	Greek 437	3,240	3H,0F0H
69	Swedish I	0,69	0H,045H	1009	Greek 928	3,241	3H,0F1H
70	Danish	0,70	0H,046H	1011	Greek 437 Cyprus	3,243	3H,0F3H
71	Norwegian	0,71	0H,047H	1012	Turkey	3,244	3H,0F4H
72	Dutch	0,72	0H,048H	1013	Cyrillic II-866	3,245	3H,0F5H
73	Italian	0,73	0H,049H	1014	Polska Mazovia	3,246	3H,0F6H
74	French Canadian	0,74	0H,04AH	1015	ISO Latin 2	3,247	3H,0F7H
75	Spanish	0,75	0H,04BH	1016	Serbo Croatic I	3,248	3H,0F8H
76	Swedish II	0,76	0H,04CH	1017	Serbo Croatic II	3,249	3H,0F9H
77	Swedish III	0,77	0H,04DH	1018	ECMA-94	3,250	3H,0FAH
78	Swedish IV	0,78	0H,04EH	1019	Windows East Europe	3,251	3H,0FBH
79	Turkish	0,79	0H,04FH	1020	Windows Greek	3,252	3H,0FCH
80	Swiss I	0,80	0H,050H	1021	Latin (Windows Turkey)	3,253	3H,0FDH
81	Swiss II	0,81	0H,051H	1022	Windows Cyrillic	3,254	3H,0FEH
90	Publisher	0,90	0H,05AH	1024	Hungarian CWI	4,0	4H,000H
91	Welsh	0,91	0H,05BH	1026	ISO Latin 4 (8859/4)	4,2	4H,002H
437	USA	1,181	1H,0B5H	1027	Ukrainian	4,3	4H,003H
774	Baltic 774	3,6	3H,006H	1028	Roman-8	4,4	4H,004H
850	Multilingual	3,82	3H,052H	1029	ISO Latin 6 (8859/10)	4,5	4H,005H
852	East Europe Latin II-852	3,84	3H,054H	1030	Hebrew NC (862)	4,6	4H,006H
855	Cyrillic I-855	3,87	3H,057H	1031	Hebrew OC	4,7	4H,007H
857	Turkey 857	3,89	3H,059H	1032	Windows Hebrew	4,8	4H.008H
860	Portugal	3,92	3H,05CH	1033	KBL- Lithuanian	4,9	4H,009H
861	Icelandic-861	3,93	3H,05DH	1034	Windows Baltic	4,10	4H,00AH
862	Hebrew NC (862)	3,94	3H,05EH	1035	Cyrillic-Latvian	4,11	4H,00BH
863	Canada French	3,95	3H,05FH	1072	Bulgarian	4,48	4H,030H
865	Norway	3,97	3H,061H				

Table 5 Code page definition table

NOTE: The code page field is a 16-bit field that is equivalent to the code page number. For example, 1 * 256 + 181 = 437. For the IPCL command, the page is specified in ASCII as a 4-byte field.

Function	**Print control character**
ASCII	[ESC] ^ <n>
Hexadecimal	1BH 5EH <n>
Decimal	<27><94><n>
IPCL	&%CC <m_1><m_2><m_3>
Description	This command allows characters from 0 to 31 codes to be printed. During normal operation, characters from 0 to 31 are control characters. This command turns off control code translation for the following character. <n> can be from 0 to 255.

Function	**Redefine character set**
ASCII	[ESC] [S <L_L> <L_H> <B_C> <T_{1H}><T_{1L}> <T_{2H}><T_{2L}> <T_{3H}><T_{3L}> … <T_{nH}><T_{nL}>
Hexadecimal	1BH 5BH 40H
Decimal	<27><91><64>
IPCL	none
Description	This command allows an application to replace or redefine the active character set mapping in the printer. Where <L_L> <L_H> defines the total length of the following data: <L_L> + 256*<L_H> = 1 + 2 * is the total number of characters to be replaced. <B_C> is the first character in the active map to be replaced. <T_{1H}><T_{1L}>[2] is the internal address of the replacement character image. The mapping of a print pattern to each character address is referred to a code page or character set. At any given time the printer character set is comprised of 256 characters. Each character is addressed by an 8-bit value generally referred to as a character code. For example, if you want to print an ‘A’, it would be addressed by sending a <65> decimal to the printer. There are 65 predefined code pages or character maps that assign characters to a particular address built into the printer. However, there are times when an application would like to redefine a character or group of characters in a code page. To allow this, the 80PLUS Printer allows the map for any code page to be redefined or replaced. The “Define Character Set” command allows any character or group of characters to be replaced with any other printable character. There are over 500 printable master characters defined in the printer. To redefine the character map for the 35th character and replace it with internal master character 346, the following redefine character set command is used. [ESC][S <3> <0> <35> <90> <1> ^^^^ ^^ ^^^^^^ | | +- 346th Character in Master set | | [(1*256) + 90] | +------- 35th Character +----------- 3 Bytes to follow [(0*256) + 3]

[2] The internal character map is provided in a separate document.

The new map will remain until the printer is power cycled or the character set is redefined. The code page and character set commands completely redefine this table.

Function	**Insert Euro Character**
ASCII	[ESC] [C <n>
Hexadecimal	1BH 5BH 43H …
Decimal	<27><91><67>
IPCL	&%EU
Description	This command allows an application to replace any character in the currently active character set with the Euro character. The character to be replaced is defined by <n>. For example, if the currently active character set is CP 850 (multilingual) and the 0D5H character is to be the Euro character, “1BH 5BH 43H 0D5H” will replace the character at 0D5H with the Euro symbol.

Character Print Control

Character Pitch

Function	**Begin 10 cpi character pitch**
ASCII	[DC2]
Hexadecimal	12H
Decimal	<18>
IPCL	&%F3
Description	This command sets 10 characters per inch (cpi) print pitch.

Function	**Begin 12 cpi character pitch**
ASCII	[ESC] :
Hexadecimal	1BH 3AH
Decimal	<27><58>
IPCL	&%F2
Description	This command sets 12 characters per inch (cpi) print pitch.

Function	**Begin 17 cpi character pitch**
ASCII	[SI]
Hexadecimal	0FH
Decimal	<15>
IPCL	&%F1
Description	This command sets 17 characters per inch (cpi) print pitch

Function	**Set specified character pitch**		
ASCII	[ESC] [P <n>		
Hexadecimal	1BH 5BH 50H <n>		
Decimal	<27> <91> <80> <n>		
IPCL	&%F<n>		
Description	This command sets character per inch (cpi) print pitch to <n>.		
Where n	<10>	selects 10 cpi	&%F3
	<12>	selects 12 cpi	&%F2
	<15>	selects 15 cpi	&%F6
	<17>	selects 17 cpi	&%F1
	<20>	selects 20 cpi	&%F5

Function	**Set intercharacter spacing**
Mode	Global
ASCII	[ESC] V <n>
Hexadecimal	1BH 56H <n>
Decimal	<27> <86> <n>
IPCL	none
Description	This command sets intercharacter spacing by adding white space between characters. The value of <n> sets the spacing and can range from 0 to 256. The normal pitch set commands set the intervalue to 0. Each value of n adds 1/180 inch to the space between characters.

Function	**Set left/right print margin**
ASCII	[ESC] X <n1> <n2>
Hexadecimal	1BH 58H <n1> <n2>
Decimal	<27><88> <n1> <n2>
IPCL	none
EPOS	[ESC]l, [ESC]Q
Description	This command sets left and right print margins in characters from the home position.
Where	n1 = Left margin
	n2 = Right margin
	The absolute position depends on the current print pitch.
	This command should be issued at the start of a new line. If it is not, the previous data will be printed, and this command will take effect on the next line.

Rotated Fonts

Function	**Begin 90° or 270° rotated font**
ASCII	[ESC] P <n>
Hexadecimal	1BH 50H nH
Decimal	<27><80><n>
IPCL	&%RI {n=2},&%RF{n=1},&%RN{n=0}
Description	This command sets the print font to a rotated 90° or 270° font.
Where	n = 0 Normal n = 1 Rotate 90° n = 2 Rotate 270° n = 5 Rotate 90° n = 6 Rotate 270°
	The rotated print font is a 1 pass 7 x 9 or 5 x 7 font. Enhanced, emphasized, subscript, superscript, and underline character attributes are not available in this mode. Double-wide and double-high fonts are available. However, because the font is rotated, double-wide font will make the characters taller and double-high font will make the characters wider.
	The current pitch sets the spacing between lines. If 8 cpi is set, the printer will produce the equivalent of 8 lines per inch rotated print. Print pitches greater than 15 cpi are very small and difficult to read.
	This mode prints faster than the formatted, rotated print mode. However, no formatting is available in this mode.

Function	**End 90° rotated font**
ASCII	[ESC] P <0>
Hexadecimal	1BH 50H 0H
Decimal	<27><80><0>
IPCL	&%RN
Description	This command returns the print font to normal nonrotated mode.
	NOTE: This command leaves the printer in utility print mode.

Character Attribute Commands

Function	**Begin one-line double-wide print**
ASCII	[SO]
Hexadecimal	0EH
Decimal	<14>
IPCL	&%MW
Description	This command causes subsequent characters to be printed at twice the currently selected character width. For example, 10 cpi becomes 5 cpi, 17 cpi becomes 8.5 cpi, and so on. This command will remain in effect until: A. A valid line terminator is received (CR, LF, or fine line feed); B. The command is canceled; or C. The maximum number of characters per line is reached, and the printer performs an auto print.

Function	**Cancel one-line double-wide print**
ASCII	[DC4]
Hexadecimal	14H
Decimal	<20>
IPCL	&%MN
Description	This command cancels one-line double-wide mode set by the [SO] command and allows single- and double-wide characters to be printed on the same line.

Function	**Multiline, double-wide, and double-high print**
ASCII	[ESC] W <n>
Hexadecimal	1BH 57H <n>
Decimal	<27><87><n>
IPCL	&%FD, &%FS, &%FH
	NOTE: Single-wide, double-high mode is not available in IPCL.
Description	This command controls multiline double-wide or double-high mode.

Where

n	Specifies the mode	
0	Standard single-wide and single-high	&%FS
1	Begin double-wide	&%FD
2	Begin double-high	None
3	Begin double-wide and double-high	&%FH

NOTE: This command does not affect line spacing.

Function **Set print style: double-wide, double-high**

ASCII [ESC] [@ [EOT] [NUL] <k> [NUL] <n> <m>

Hexadecimal 1BH 5BH 40H 04H 00H <k> 00H <n> <m>

Decimal <27><91><64> <04> <0> <K> <0> <n> <m>

IPCL &%DH Double-high, double-wide, and double-space
&%SH Single-high, single-wide, and single-space
Also, see [ESC] W above.

Description This command sets double-wide, double-high, and italic print mode.

Where	k-bits	76543210	
		----xxxx	Italic control
	0	----0000	No change
	1	----0001	Italic On
	2	----0010	Italic Off
Where	n-bits	76543210	
		----xxxx	Height multiplier
	0	----0000	No change
	1	----0001	Single-high
	2	----0010	Double-high
		xxxx----	Line spacing
	0	0000----	No change
	16	0001----	Single line feed
	32	0010----	Double line feed
Where	m-bits	76543210	
		----xxxx	Width multiplier
	0	----0000	No change
	1	----0001	Single-wide
	2	----0010	Double-wide

Function **Begin underline**

ASCII [ESC] - <1>

Hexadecimal 1BH 2DH 01H

Decimal <27><45><1>

IPCL &%MU

Description This command begins underline print mode. All subsequent text and leading spaces will be underlined. Trailing spaces are also underlined.

NOTE: Underline is not available in High Speed Draft mode.

Function **End underline**

ASCII [ESC] - <0>

Hexadecimal 1BH 2DH 00H

Decimal <27><45><0>

IPCL &%CU

Description This command ends underline print mode.

Function	**Begin enhanced print**
ASCII	[ESC] G
Hexadecimal	1BH 47H
Decimal	<27><71>
IPCL	&%ME
EPOS	[ESC] G <1>
Description	All subsequent text will be printed in an enhanced (darker looking) print mode.

Function	**End enhanced print**
ASCII	[ESC] H
Hexadecimal	1BH 48H
Decimal	<27><72>
IPCL	&%CE
EPOS	[ESC] G <0>
Description	This command cancels enhanced print mode and returns to the currently selected font.

Function	**Begin emphasized print**
ASCII	[ESC] E
Hexadecimal	1BH 45H
Decimal	<27><69>
IPCL	&%MM
EPOS	[ESC] E <1>
Description	This command is the same as enhanced print.

Function	**End emphasized print**
ASCII	[ESC] F
Hexadecimal	1BH 46H
Decimal	<27><70>
IPCL	&%CM
EPOS	[ESC] E <0>
Description	This command cancels emphasized print mode.

Formatted Print Rotation Commands

To provide flexibility in printing various sized forms, rotated print capability is provided. This mode will rotate the print in any of three 90° orientations.

In 90° and 270° rotated mode, the print data is first buffered by the printer, processed (rotated) and then printed. This causes the print process to be delayed slightly as it takes some time to process the data before it is printed. In 180° mode, the print is simply inverted and mirrored.

Because the 90° and 270° rotated print buffer is limited, the amount of rotated print is also limited. The printer can support a limit of 23 lines of rotated print with a maximum line length of 128 characters.

The spacing between lines is controlled by a line spacing table. This table is defined by the rotated print line spacing ([ESC] u ...) command or by inserting [LF] or [ESC]J<n> commands in the rotated data. The [ESC]u command specifies the space to be added between each printed line. Each line has an entry in the table. There is room for 23 lines in the table. The minimum spacing (and default) is 1/80 inch between lines.

If a [LF] is used to specify the line spacing, it overrides the default table and sets spacing to 1/80 inch. If [ESC] J <n> is used, <n> specifies the spacing in n/216 inch (including white space).

The intercharacter spacing is adjusted with the normal line spacing commands. The [ESC]3<n> command is the most effective command for adjusting intercharacter spacing.

Specifying the line length is useful to determine where data is printed if line formatting is specified. When rotated 90° and 270°, the print field can be extended to print the complete line length specified. This mode is called line formatted mode. In line formatted mode, the line length is set not by the longest line entered but by the set line-length command. The default line length is 80 characters, However, any value from 1 to 128 may be selected. Anything past the selected length will be wrapped to the next line.

In rotated 180° mode, all spacing commands are effective. This mode of operation simply inverts and mirrors the print operation. All line spacing and print features are available. It should be noted that the feed direction is not effected by any of the rotate commands.

Function	**Begin rotated print**
ASCII	[ESC] r <X>
Hexadecimal	1BH 72H 0XH
Decimal	<27><114><X>
IPCL	&%RX
EPOS	[ESC] T <3>

Description

This command starts rotated print mode where X defines the mode as follows:

n-bits

76543210	Function
----xx00	End rotated print
----xx01	Rotate 90°
----0010	Rotate 180°
----xx11	Rotate 270°
----x1xx	Use line formatting

If X = 1 or 9, rotate print mode by 90°. Print data is entered normally from left to right, top to bottom. When an End Rotated Print ([ESC] r <0>) command is received, the printer will format and print the data.

If X = 5 or 13, rotate print mode 90° with formatting. This command differs from the [ESC] r <1> command in that the line length is determined not by the longest line entered, but by the line length set by the [ESC] s command. If input extends past the end of a line, the print will line wrap.

If X = 3 or 11, 270° rotated print mode is entered. The print will be rotated 270° according to the currently stored format parameters.

If X = 7 or 15, 270° rotated print mode is entered. The print will be rotated 270° according to the currently stored format parameters. This command differs from the [ESC] r <3> command by spacing out the lines to the line length specified by the [ESC] s command. If input extends past the end of a line, the print will line wrap.

If X = 2, 180° rotated print mode is entered. All subsequent lines will be rotated 180° and positioned at the opposite margin. All normal fonts and modes are available in 180° rotated mode. The format and font bits are ignored by this command. This command will remain in effect until rotation is canceled with an End Rotated Print ([ESC] r <0>) command, or a station select command is issued.

Rotated Print Summary:

Function	**Begin 90° rotated print**
ASCII	[ESC] r <1>
Hexadecimal	1BH 72H 01H
Decimal	<27><114><1>
IPCL	&%R1

Function	**Begin 90° rotated print with line formatting**
ASCII	[ESC] r <5>
Hexadecimal	1BH 72H 05H
Decimal	<27><114><5>
IPCL	&%R5

Function	**Begin 270° rotated print**
ASCII	[ESC] r <3>
Hexadecimal	1BH 72H 03H
Decimal	<27><114><3>
IPCL	&%R3

Function	**Begin 270° rotated print with line formatting**
ASCII	[ESC] r <7>
Hexadecimal	1BH 72H 07H
Decimal	<27><114><7>
IPCL	&%R7
EPOS	[ESC] T <1>

Function	**Begin 180° rotated print**
ASCII	[ESC] r <2>
Hexadecimal	1BH 72H 02H
Decimal	<27><114><2>
IPCL	&%R2

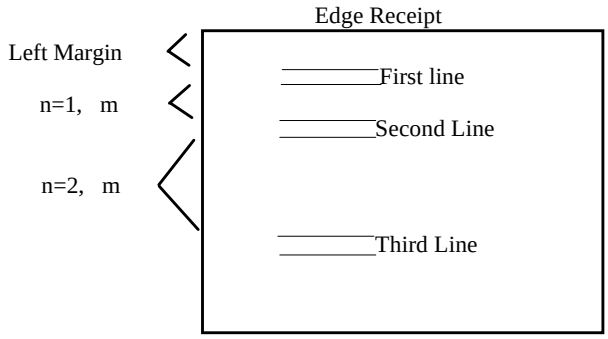
Function	**End rotated print**
ASCII	[ESC] r <0>
Hexadecimal	1BH 72H 00H
Decimal	<27><114><0>
IPCL	&%R0
EPOS	[ESC] { <0>
Description	This command prints the contents of the rotated print buffer (if 90° or 270° mode) and returns to normal print orientation. In 180° mode, the printer will return to normal mode.

Function	**Set rotated print line length**
ASCII	[ESC] s <n>
Hexadecimal	1BH 73H <n>
Decimal	<27><115><n>
IPCL	&%RL <m_1> <m_2><m_3>
EPOS	none
Description	This command sets the print line length to be used in auto-format rotated print mode. The maximum number of characters is 128 per line. The power on default line length is 80 characters.

Function	**Set rotated print line spacing**
ASCII	[ESC] u <n_1> <m_1> <n_2> <m_2> ... <n_i> <m_i> <0>
Hexadecimal	1BH 75H <n_1> <m_1> <n_2> <m_2> ... <n_i> <m_i> 00H
Decimal	<27><117> <n_1> <m_1> <n_2> <m_2> ... <n_i> <m_i> <0>
IPCL	none
EPOS	none
Description	This command adjusts line spacing for each rotated print line. Where n_i is the line number, m_i is the spacing in 1/80 inch from the previous line.

For the first print line, the distance is calculated from the margin. An n_i value of 0 is used to terminate the command. Any unspecified spacing will be set to 1. These values will be used as a template for all subsequent, rotated print. On power up, all spacing is preset to 1/80 inch for all lines. This command is only effective in 90° and 270° rotation. It will remain in effect until a new table is received or until the printer is power cycled. An [ESC] u <0> will have the effect of setting all lines to 1. This table can be overridden by an [LF] or [ESC] J <n> command in the rotated print data.

The value of m can be from 1 to 127; n can be from 1 to 23.



Graphics Mode

The OKIPOS 80 Plus III Printer conforms to the general definitions of IBM APA graphics. The printer will only print graphics that are 2.83 inches wide. This can make it difficult to use off-the-shelf graphic generation programs.

If the OKIPOS 80 Plus III Printer is used with programs that convert text to graphics, the printer will be slower than if the printer is sent ASCII text. The OKIPOS 80 Plus III Printer is supported by a Windows print driver that will allow applications to select fonts that are supported by the printer.

The 80PLUS Printer maps all APA graphic modes to the native 200 dpi resolution of the printer. These commands are provided to allow existing applications to print graphics.

Standard APA Graphics

Function	**Print single-density graphics (60h x 72v dpi)**
ASCII	[ESC] K <n>1 <n>2
Hexadecimal	1BH 4BH <n>1 <n>2
Decimal	<27><75><n>1 <n>2
IPCL	none
Description	This command prints n1 + 256*n2 bytes of single-density graphics (60 dpi).

Function	**Print half-speed double-density graphics (120h x 72v dpi)**
ASCII	[ESC] L <n>1 <n>2
Hexadecimal	1BH 4CH <n>1 <n>2
Decimal	<27><76><n>1 <n>2
IPCL	none
Description	This command prints n1 + 256*n2 bytes of double-density graphics (120 dpi) at half speed, allowing full and half dots to be printed.

Function	**Print full-speed double-density graphics (120h x 72v dpi)**
ASCII	[ESC] Y <n>1 <n>2
Hexadecimal	1BH 59H <n>1 <n>2
Decimal	<27><89><n>1 <n>2
IPCL	none
Description	This command prints n1 + 256*n2 bytes of double-density graphics (120 dpi) at full speed, no consecutive dots. (This mode is generally used to print 120h by 144v dpi resolutions in two passes)

Function	**Print quad-density graphics (240h x 72v dpi)**
ASCII	[ESC] Z <n>1 <n>2
Hexadecimal	1BH 5AH <n>1 <n>2
Decimal	<27><90><n>1 <n>2
IPCL	none
Description	This command prints n1 + 256*n2 bytes of quad-density graphics (240 dpi) at full speed with consecutive dots. (This mode is generally used to print 240h by 144v dpi resolutions in two passes)

Extended APA Graphics

Function	**Print graphics in mode <n> (60h/120h/240h x 72v dpi)**
ASCII	[ESC] * <m> <n>[1] <n>[2]
Hexadecimal	1BH 2AH <m><n>[1] <n>[2]
Decimal	<27><42><m><n>[1] <n>[2]
IPCL	none
Description	This command selects one of the following graphic modes as specified by <m>.

Where <m>				
	0	60 dpi	7	144 dpi
	1	120 dpi	8	100 dpi
	2	120 dpi	9	200 dpi
	3	240 dpi	10	101 dpi
	4	80 dpi	11	203 dpi
	5	72 dpi	12,13,14,16	not supported
	6	90 dpi		

Function	**Reassign graphic mode**
ASCII	[ESC] ? <m> <n>
Hexadecimal	1BH 3FH <m><n>
Decimal	<27><63><m><n>
IPCL	none
Description	This command reassigns graphic mode <m> to resolution <n>. Possible values for <m> are K, L, Y, or Z. Resolutions <n> are 0 to 7 as follows:

Where <m>					
	0	60 dpi	Default for K	7	144 dpi
	1	120 dpi	Default for L	8	100 dpi
	2	120 dpi	Default for Y	9	200 dpi
	3	240 dpi	Default for Z	10	101 dpi
	4	80 dpi		11	203 dpi
	5	72 dpi		12,13,14,16	not supported
	6	90 dpi			

Function	**Print single-density graphics**
ASCII	[ESC] * <m> <n>1 <n>2
Hexadecimal	1BH 4BH <n>1 <n>2
Decimal	<27><75><n>1 <n>2
Description	This command prints n1 + 256*n2 bytes of graphics where m specifies the density.
Where m	0 Single-density graphics (60 dpi) 1 Double-density graphics (120 dpi) 2 Double-density half-speed graphics (120 dpi) 3 High-density graphics (240 dpi) 4, 5 CRT II Screen (72 dpi) 6 CRT I Screen (90 dpi) 7 Dual plotter (144 dpi) 8 100 dpi 9 200 dpi 10 101 dpi 11 203 dpi

Graphic Save

The OKIPOS 80 Plus III Printer contains a graphic save buffer. This buffer is 63K bytes long and can be saved in the printer's nonvolatile memory. The nonvolatile memory is read at power up and is available to be printed with a single command. The purpose of this feature is to allow a graphic logo to be stored in the printer and printed on command.

The buffer is intended to save a graphic image. However, any print information can be saved and then reprinted. The print information in this buffer can be replaced at any time and then reprinted. It does not need to be saved in the nonvolatile memory. It is feasible for the buffer to be used to create a duplicate receipt.

Programming considerations

This feature works by inserting the save graphic buffer into the printer data stream when the print graphic save command is encountered.

Some care should be taken when forming this buffer. Because when this buffer is inserted, any configuration commands (like font or pitch changes) will remain in effect after the buffer is complete and/or printed.

The nonvolatile memory has a limited number of write-cycle operations. For this reason, the number of saves should be limited. The buffer should not be saved on a transaction by transaction basis. Once a day should be the limit.

The buffer is 63K bytes long. All commands[3] and print data are placed in the buffer and both must be included in the 63K limit. There is no indication by the printer when it is full. The application must make sure that the buffer is not overfilled. The printer will simply stop saving information in the buffer after 63K characters are received.

As the buffer is filled, the input data is printed normally. The effect of the graphic save start command is to start to save the input data. The graphic save stop command stops saving data and initializes internal pointers for the next print. The graphic save "stop and save" command stops the save, writes the buffer to the nonvolatile memory, and then initializes the internal pointers for the next print. The graphic save print command inserts the buffer into the print stream after the graphic save print command.

[3] IPCL commands are converted by the printer into an equivalent [ESC] code and then placed in the save buffer. The equivalent [ESC] code should be used to calculate the size of the save buffer data.

Function	**Graphic save print**
ASCII	[ESC] g <0>
Hexadecimal	1BH 67H 00H
Decimal	<27><103><0>
IPCL	&%GP
EPOS	[ESC] g <0>
Description	This command prints the graphic save buffer.

Function	**Start graphic save record**
ASCII	[ESC] g <1>
Hexadecimal	1BH 67H 01H
Decimal	<27><103><1>
IPCL	&%GS
EPOS	ESC] g <1>
Description	This command clears the graphic save buffer and starts recording data. The next 24K bytes (including characters and commands) will be recorded.

Function	**Stop graphic save record**
ASCII	[ESC] g <2>
Hexadecimal	1BH 67H 02H
Decimal	<27><103><2>
IPCL	&%GE
EPOS	[ESC] g <2>
Description	This command stops recording graphic save information. The buffer is not saved into nonvolatile memory.

Function	**Stop graphic save record and save**
ASCII	[ESC] g <3>
Hexadecimal	1BH 67H 03H
Decimal	<27><103><3>
IPCL	&%GW
EPOS:	ESC] g <3>
Description	This command stops recording graphic save information. The buffer is saved into nonvolatile memory. **NOTE:** The printer will remain busy for about seven seconds after this command. This time is required to erase and resave the graphic save buffer into the nonvolatile memory.

Bar codes

The OKIPOS 80 Plus III Printer supports the ability to print bar codes. The printer will print one of five formats, Interleaved 2 of 5, Code 39, Code 128, UPC A, or EAN-13. The host does not need to form the graphic image for these bar codes. The host need only send the printer the information to be bar coded, and a graphic will be generated. Bar codes can be printed in a high-resolution "normal" mode or a "fast" high-speed mode. The normal mode is more readable than the high-speed mode. (See the [ESC][EM]B command on the next page for setting the bar code height and print speed.)

Function	**Print bar code**			
ASCII	[ESC] b <n>{information}[ETX]			
Hexadecimal	1BH 62H <n>... 03H			
Decimal	<27><98><n> ... <3>			
IPCL	&%25 ... [CR]	Interleaved 2 of 5	&%39 ... [CR]	Code 39
	&%12 ... [CR]	Code 128	&%UP ... [CR]	UPC A
	&%UE ... [CR]	UPC E	&%EA ... [CR]	EAN-13
	&%E8 ... [CR]	EAN-8		
Description	This command prints the information as a bar code. The bar code will be centered on the print zone.			

Where n	0	Interleaved 2 of 5	Numeric (0-9) only; must be even number of digits
	1	Code 39	26 uppercase letters (A-Z); 10 digits (0-9)
	2	Code 128	Three sets of 106 different characters
	3	UPC A	Numeric (0-9) only; 11 digits
	4	EAN-13	Numeric (0-9) only; 12 digits
	5	UPC E	Numeric (0-9) only; 11 digits
	6	EAN-8	Numeric (0-9) only; 6 digits

Interleaved 2 of 5	This is a high-density, self-checking, continuous, numeric bar code. It is mainly used where fixed length numeric fields are required. The data field must be an even number of characters. If an odd data field is sent to the OKIPOS 80 Plus III Printer, it will be zero padded. Due to space limitations, only 20 characters can be printed. (**NOTE:** Interleaved 2 of 5 does not read well in "fast" mode.)
Code 39	This is an alphanumeric bar code. It is a discrete, self-checking, variable-length code. The complete data field is printed. Due to space limitations, only 10 characters can be printed. If illegal characters are passed to the printer, they are converted to legal codes. For example, a $\rightarrow$ A.
Code 128	This is an alphanumeric bar code. It is a high density, variable length, continuous code that employs multiple element widths. Code 128 has three possible start codes. The start code defines the code set: A, B, or C. The first character in the data field defines the Code Set. Start Code A = <135>; Code B = <136>; and Code C = <137>. The complete data field is printed. Due to space limitations, only ten characters can be printed. The printer generates a check digit.
Code 128 Note	With Code 128, the 'A' space is defined as a <0>. This makes programming difficult and causes control character conflicts for the printer. To help solve these problems in Code 128, the OKIPOS 80 Plus III Printer subtracts 32 from all characters that are to be included in the bar code. In the Code 128 definition, an 'A' is <33>. However, the printer will convert an ASCII 'A' (<65>) to a <33> internally which forces Code 128C and the start codes off by 32.

UPC A	This is a fixed length, numeric, continuous code that employs four element widths. The printer supports Universal Product Code Versions A, E, EAN-8, and EAN-13. Version A encodes 11 digits. Typically, the UPC A format starts with a number system digit, 5-digit manufacturer's code, 5-digit product code, and a check digit. The printer makes no assumptions about any of the codes except the check digit. The printer will print a UPC bar code with the 11 digits sent to it and generate the check digit. If fewer than 11 digits are sent, the remaining digits will be 0. The printer will print a UPC that is about 130% the size of the UPC nominal standard. This provides optimal readability.
UPC E	This is a zero suppression version of UPC. The printer requires that the first digit be 0 for number system 0. If it is not zero, the bar code is not printed. The printer does the compression based on the compression rules for UPC E. The printer will print a UPC bar code based on the 11 digits sent to it and generate the check digit. If fewer than 11 digits are sent, the remaining digits will be 0. The printer will print a UPC that is about 130% the size of the UPC nominal standard. This provides optimal readability.
EAN-13	This is a fixed length, numeric, continuous code that employs four element widths. The printer supports EAN-13, a superset of UPC that encodes 12 digits. Typically, the format starts with a number set digit, which defines how the next 6 digits are encoded. The next 5 digits have fixed encoding. The last is a check digit. The printer will print an EAN-13 bar code with the 12 digits sent to it and generate the check digit. If fewer than 12 digits are sent, the remaining digits will be 0. The printer will print an EAN-13 bar code that is about 130% the size of the nominal standard. This provides optimal readability.
EAN-8	This is a fixed length, numeric, continuous code that employs four element widths. The printer supports EAN-8, a superset of UPC that encodes 7 digits. The printer will print an EAN-8 bar code with the 7 digits sent to it and generate the check digit. If fewer than 7 digits are sent, the remaining digits will be 0. The printer will print an EAN-8 bar code that is about 130% the size of the nominal standard. This provides optimal readability. **NOTES:** A [CR] may also be used in place of the [ETX] to end the bar code data field. Only information that is usable in a particular bar code will be printed.

Function	**Bar code height**
ASCII	[ESC] [EM] B <n>
Hexadecimal	1BH 19H 42H <n>
Decimal	<27><25><66><n>
IPCL	&%BH <m_1> <m_2>
Description	This command sets the bar code height and speed where <n> is the number of print passes and <m> is the speed. Each pass is about 0.11 inch high. If n = <0>, the printer returns to the default values of four passes for all except UPC which is seven. Any value from 0 to 9 may be specified.

Printer Control

Function	**Clear print buffer**
ASCII	[CAN]
Hexadecimal	18H
Decimal	<24>
IPCL	&%RP
Description	This command clears the print buffer and any unprinted information in the printer received before the [CAN]. If the input buffer is not being processed because the printer is out of paper or a form has not been inserted, the CAN command will not be processed until after the error is cleared. The CAN command does not restore default conditions. It only clears the print buffers.

Function	**Query marker**
ASCII	[ESC] q <n>
Hexadecimal	1BH 71H <n>
Decimal	<27><113>
IPCL	none

Function	**Returns a status to the host when it is processed**	
Response	Serial/IEEE 1284	Parallel, non-IEEE 1284
	[SOH]<n>…	Not supported via PE
Description	This command can be placed in the print data and, when processed by the printer, will return a progress status marker. The value of <n> can be any 8-bit value. It is returned to the host unaltered. The intent is for it to be a sequence number. This command can be used to track the print progress of the printer or verify that the data has been printed. **NOTE:** This command is a line terminator and causes the printer to print all previous data. If a normal line terminator (like a [CR]) is not supplied, right justify and auto center will not function correctly. All data will be left justified. [ESC]q does not perform a [CR] or [LF] function.	

Function	**Open cash drawer**
ASCII	[ESC] x <n>
Hexadecimal	1BH 78H <n>
Decimal	<27><120><n>
IPCL	&%D1 for Cash Drawer 1
IPCL	&%D2 for Cash Drawer 2
Description	This command energizes cash drawer n for 150 ms.
Where <n>	<1> (01H) or 1 (31H) - Cash Drawer 1 <2> (02H) or 2 (32H) - Cash Drawer 2
	The time period the drawer is activated can be changed in the configuration menu. The activation time can be set from 25 ms to 250 ms.
	NOTES: The open cash drawer commands are processed as part of the print data. They are not processed until they are found in the input buffer by the print processor. They are not immediate commands.
	Cash Drawer 2 is factory configurable in one of two modes. Either Pin 2 or 3 is active depending on an internal jumper setting. The factory default is Pin 3. Cash Drawer 1 is always on Pin 2.
	The cash drawer status is defined as an open circuit for drawer closed.

Function	**Activate receipt cutter**
ASCII	[ESC] v
Hexadecimal	1BH 76H
Decimal	<27><118>
IPCL	&%FC Cut
EPOS	[ESC] m or [ESC] i
Description	This command cuts receipt tape and is only active in receipt mode. It will cut the receipt tape above the current print line.
	NOTE: This command is only effective on printers with a knife.

Function	**Print suppress and data pass through**
ASCII	[ESC] < <n>
Hexadecimal	1BH 3CH <n>
Decimal	<27><60><n>
IPCL	none
Description	This command provides print suppress and data pass through features.
Where	Bit 0 Printer select Bit 1 Pass through on Bits 2-7 Undefined
	If Bit 0 is clear, the printer will stop processing data. If Bit 1 is set, the data will be passed through the printer and be sent out on the serial port.
	NOTE: The pass through command is preprocessed and is not part of the print data. It is processed immediately when it is found in the data stream. The printer will continue to process and print data that was previously entered.
	NOTE: If the printer is configured for parallel operation, the data will still be pass through on but on the IEEE 1284 return channel. This is not very useful and should be avoided.
	NOTE: These commands do not function if M50 compatibility is turned on. M50 pass through must be used.

Function	**Control feature commands**
ASCII	[ESC] y <n>
Hexadecimal	1BH 79H <n>
Decimal	<27><121><n>
IPCL	&%Y0 through 9
Where n	0 restores configures emulation
	1 forces Axiohm emulation
	2 forces Ithaca emulation
	3 forces Epson emulation
	4 disables IPCL commands
	5 enables IPCL commands
	6 disables ENQ processing
	7 enables ENQ processing
	8 enables extended diagnostics
	9 prints self-test banner
Description	This command enables and disables command set features. It is possible that the IPCL commands will interfere with print data. If this is the case, they can be disabled with an [ESC] y <4>. Once disabled, the IPCL command for reenablement will not function.
	NOTES: Once disabled, the &%Y5 command will not be a valid IPCL code.
	IPCL commands are not available in Epson and Axiohm modes.
	ESC y <6> and <7> enable and disable the real-time status inquire processing. The [ESC] y control commands are not processed as they are received, but are buffered then processed. Because of this, any [ENQ] commands sent after a disable may be answered. In addition, [ENQ]'s sent after an enable may not be answered.

Function	**Multidrop control**
ASCII	[SOH] <n>
Hexadecimal	01H <n>
Decimal	<1> <n>
IPCL	none
	Where <n> is the printer address, addresses of A, B, or C are configurable. In multidrop mode, the printer must be addressed. This is the addressing command. If the printer is configured with an address of 'A,' the printer will operate when addressed. When any other address is sent to the printer, it will enter print suppress mode. An address of 'Z' is a universal address and will always activate the printer.

M50 Compatibility Commands

To allow the M80PLUS Printer to replace the M50 printer without effecting the M50 application, several special M50 commands are available as M50 extensions. Because these commands can have effects that M80PLUS applications may not want, these commands must be enabled.

To enable these commands, select the M50 emulation in the configuration.

Function	**Extended M50 cash drawer commands**
ASCII	[BS]
Hexadecimal	08H
Decimal	<8>
Description	This command opens Cash Drawer 1.

Function	**Extended M50 cash drawer commands**
ASCII	[BEL]
Hexadecimal	07H
Decimal	<7>
Description	This command opens Cash Drawer 2.

Function	**Extended M50 cash drawer commands**
ASCII	[ESC]+
Hexadecimal	1BH, 2BH
Decimal	<27><43>
Description	This command opens Cash Drawer 1.

Function	**Extended M50 pass through**
ASCII	[ESC] d or [ESC][RS] and [ESC]”
Hexadecimal	1BH, 23H or 1BH, 64H or 1BH, 1EH and 1BH, 22H
Decimal	<27><35> or <27><100> or <27><30> and <27><34>
Description	These are Model 50 pass through commands. [ESC] d turns on pass through, and [ESC][RS] or [ESC]” turns it off. This command requires that the pass through function be enabled in the configuration menu. **NOTE:** [ESC]# commands available in some versions of M50 printers are not available in this emulation.

Printer Status Set/Inquire

The OKIPOS 80 Plus III Printer is designed for use as part of an automated system, where the host computer makes every attempt to correct problems with the printer. In addition, the host application requires that it be able to obtain more information from the printer than is typical of normal computer printers. The normal computer printer does not have cash drawers and slip stations. As a result, the standard printer protocol must be extended to deal with the additional features of a printer.

The OKIPOS 80 Plus III Printer has defined a set of status inquiry commands that will allow the host to obtain information about the printer and devices connected to it. The method chosen to interact with the computer is designed to allow a reasonable approach to the host application. It will not always be possible for an existing application to use the ENQ commands unless the communication drivers are available to the programmer.

Serial Mode Inquire

All ENQ commands require a response from the printer. In serial operation, all ENQ commands are responded to by ACK or NAK, the command ID, and in some cases status.

The serial ACK or NAK responses are always uniform and followed with a command ID. This makes the design of the host application easier because the response can be identified and always follows the same format.

The printer will always accept serial data even if the printer is off-line. It is possible to send inquire commands to the printer even if it is off-line. Because ENQ commands are processed before they go in the buffer, the printer will respond even if the printer is busy printing.

In serial mode, it is desirable that the response to an ENQ be received by the host before another ENQ command is issued to the printer. When the printer receives an ENQ, it must generate a response. If ENQ's are sent to the printer too fast, the printer will spend all of its time responding to ENQ's and have no time to print.

IEEE 1284 Mode Inquire

In parallel IEEE 1284 mode, there is a way to return status information to the host. After the host makes an ENQ request, the host can activate IEEE 1284 Mode 0 reverse channel and wait for a response from the printer. The response to the ENQ is identical to serial mode.

The printer will always accept IEEE 1284 reverse channel requests but will not accept ENQ commands when off-line. It is possible to obtain status when off-line by placing the printer in dynamic response mode before the printer goes off-line. The IEEE 1284 reverse channel will then respond to status changes even if the printer is off-line. It is also possible to configure the printer, so it will not go off-line in most cases. Power off, paper out, and faults will always generate off-line status.

Inquire Commands

Function	**Inquire printer status**
ASCII	[ENQ] <n>
Hexadecimal	05H <n>
Decimal	<5><n>
IPCL	none
EPOS	[GS] r or [DLE] [ENQ] or [DLE] [EOT]
Description	This command inquires printer status and returns the result. The following ENQ's are defined. **NOTE:** If the printer is off-line, ENQ's may not be accepted.

Function	**Inquire Cash Drawer 1 status**
ASCII	[ENQ] <1>
Hexadecimal	05H 01H
Decimal	<5><1>

Function	Cash Drawer 1 status
Response	ACK <1> (06H 01H) Cash Drawer 1 is closed. NAK <1> (15H 01H) Cash Drawer 1 is open. The cash drawer status is defined as open circuit being drawer closed.

Function	**Inquire Cash Drawer 2 status**
ASCII	[ENQ] <2>
Hexadecimal	05H 02H
Decimal	<5><2>

Function	Cash Drawer 2 status
Response	ACK <2> (06H 02H) Cash Drawer 2 is closed. NAK <2> (15H 02H) Cash Drawer 2 is open. The cash drawer status is defined as open circuit being drawer closed.

Function	**Inquire receipt paper out**
ASCII	[ENQ] <4>
Hexadecimal	05H 04H
Decimal	<5><4>

Function	Is receipt paper out?
Response	ACK <4> (06H 04H) There is receipt paper. NAK <4> (15H 04H) The receipt paper is exhausted.

Function	**Inquire cover open status**
ASCII	[ENQ] <8>
Hexadecimal	05H 08H
Decimal	<5><8>

Function	Inquire whether the cover is closed.
Response	ACK <8> (06H 08H) The cover is closed. NAK <8> (15H 08H) The cover is open.

Function	**Is the buffer empty? Clear IEEE 1284 buffer.**
ASCII	[ENQ] <9>
Hexadecimal	05H 09H
Decimal	<5><9>

Function	This command allows the host to know when the print buffer is empty. If IEEE 1284 is active, this command also clears the response buffer.
Response	ACK <9> (06H 09H) The buffer is empty. NAK <9> (15H 09H) The buffer is not empty.

Function	**Request printer reset**
ASCII	[ENQ] <10>
Hexadecimal	05H 0AH
Decimal	<5><10>

Function	Reset printer
Response	ACK <10> (06H 0AH) The command was accepted. NAK <10> (15H 0AH) The command was rejected.
Description	The ENQ <10>, EPOS DLE ENQ n commands, and the INIT pin all have the same effect and are termed reset commands. To prevent data loss, the printer will try to complete printing of any buffered data. This will fail if for any reason operator intervention with the printer is required. The reset operation is saved until the printer goes idle. In the case of the slip request command or any command that waits for the operator, the printer is idle. If the printer is idle and a reset is received or is pending, the printer will reset and the buffer will be cleared. If an operator intervention operation is reset by the host, any remaining buffered data will be cleared. When the printer receives a reset command, the printer will go off-line and/or busy until the reset is completed. In serial mode, the printer can have information in its high-speed buffer that was received after the reset, but before the reset was processed. If the host application continues to send information to the printer after a reset command, some of that information may be processed before the reset is processed. In parallel mode, the printer will go busy after the reset is received, but before the next byte is accepted. The printer will accept an [ENQ]<10> in parallel mode. It will not be acknowledged however. If both the serial and parallel ports are active, the serial reset will not be acknowledged either. This is because the reset operation will remove the parallel response. In IEEE 1284 mode, the response buffer is cleared by a reset command. This prevents responses in IEEE 1284 mode as well. **NOTE:** There is a menu selection that will block this command. If reset inhibit is set in the configuration menu, this command will be ignored.

Function	**Inquire power cycle status**
ASCII	[ENQ] <11>
Hexadecimal	05H 0BH
Decimal	<5><11>

Function	Has the printer been power cycled since the last request?
Response	ACK <11> (06H 0BH) Printer power has been cycled since last [ENQ] <11>. NAK <5> (15H 0BH) Printer has not power cycled since last [ENQ] <11>.
Description	The first time after a reset this command will return [ACK] <11>, after that the command will return [NAK] <11>. This command allows the application to determine if the printer has been power cycled and needs to be reinitialized. The [ENQ] <10> command and the INIT signal on the parallel port will both cause the printer to return power up status.

Function	**Inquire printer state**
ASCII	[ENQ]<15>
Hexadecimal	05H 11H
Decimal	<5><15>

Function	This command returns the current printer state.
Response	[ACK]<15><n><r1><r2>…
Where	<15> is the echo of command ID. n is the number of return bytes + 40 (28H) (to prevent confusion with XON/XOFF). <r1>: Bit 0 = Form clamp is closed. Bit 1 = Cover is closed. Bit 2 = Receipt paper is out. Bit 3 = 0 Bit 4 = Printer is in error state (waiting for error to be cleared). Bit 5 = 0 Bit 6 = 1 always Bit 7 = 0 always <r2>: Bit 0 = 0 Bit 1 = 0 Bit 2 = 0 Bit 3 = 0 Bit 4 = 0 Bit 5 = 0 Bit 6 = 1 always Bit 7 = 0 always

Function	**Inquire all printer status**
ASCII	[ENQ]<20>
Hexadecimal	05H 14H
Decimal	<5><20>

Function This command returns all status flags.

Response [ACK]<20><n><r1><r2>…

Where <20> is the echo of command ID. n is the number of return bytes + 40 (28H) (to prevent confusion with XON/XOFF).

<r1>: Bit 0 = Cash Drawer 1 is open.
Bit 1 = Cash Drawer 2 is open.
Bit 2 = Receipt paper is out.
Bit 3 = 0
Bit 4 = Receipt paper error occurs.
Bit 5 = 0
Bit 6 = 1 always
Bit 7 = 0 always

<r2>: Bit 0 = 1
Bit 1 = Cover is closed.
Bit 2 = Buffer is empty.
Bit 3 = Printer power has been cycled (does not affect state of power cycled flag). Use [ENQ]<11> to reset.
Bit 4 = Printer is waiting in error mode.
Bit 5 = 0
Bit 6 = 1 always
Bit 7 = 0 always

<r3>: Bit 0 = 1 Receipt station is selected.
Bit 1 = 0
Bit 2 = 0
Bit 3 = 0
Bit 4 = Undefined
Bit 5 = Printer is blocking print. (The cover is open or out of paper)
Bit 6 = 1 always
Bit 7 = 0 always

<r4>: Bit 0 = 1 Printer supports receipt.
Bit 1 = 0 Printer does not support inserted forms.
Bit 2 = Undefined
Bit 3 = Printer supports cutter.
Bit 4 = Printer supports partial cuts.
Bit 5 = 0 Printer does not support MICR.
Bit 6 = 1 always
Bit 7 = 0 always

Function	**Inquire printer ID**
ASCII	[ENQ]<21>
Hexadecimal	05H 15H
Decimal	<5><21>

Function	This command returns printer IEEE 1284 ID string.
Response	[ACK]<21><n>{{ID string}
Where	<21> is the echo of command ID. <n> is the number of return bytes in the ID string. {ID string} is the IEEE ID return string that follows: MFG:Ithaca-Periph.; CMD:M80CL,IPCL; MDL:80 ; DES:Ithaca-Peripherals Series 80; CLS:PRINTER;

Dynamic Response Mode

Dynamic status [ESC] w<n> can be used to allow the host to sense status changes without sending repeated ENQ commands. The operation of the dynamic response varies depending on the configuration of the printer. If the printer is configured for Serial or IEEE 1284 operation, more than one status can be sensed as the printer will respond to status changes as if an [ENQ] were issued. In parallel mode, only one status should be requested. If more than one bit is active, the result status on the PE signal is not defined.

The response to dynamic responses is the same as to inquire commands. That is, if cash drawer status is to be sensed, the PE or ACK/NAK will be the same as for inquire commands.

Function	**Enable dynamic response**
ASCII	[ESC] w <n>
Hexadecimal	1BH 77H <n>
Decimal	<27><119><n>
IPCL	none
Where n	defines the features that cause dynamic responses.

Bit 0	Cash Drawer 0	ACK/NAK <1>
Bit 1	Cash Drawer 1	ACK/NAK <2>
Bit 2	Paper Out status	ACK/NAK <4>
Bits 3-6	Undefined	
Bit 7	Cover Status	ACK/NAK <8>

Dynamic status can be used to allow the host to sense status changes without sending repeated ENQ commands. The operation of the dynamic response varies depending on the configuration of the printer. If the printer is configured for Serial or IEEE 1284 operation, more than one status can be sensed as the printer will respond to status changes as if an [ENQ] were issued. In parallel mode, only one status should be requested. If more than one bit is active, the resulting status on the PE signal will not be defined.

NOTE: Power up default is paper out on PE signal.

Extended Diagnostic Commands

Function	**Extended diagnostics**
ASCII	[GS] 7FH …
Hexadecimal	1DH 7FH
Decimal	<29><127>
IPCL	none
Description	These commands are used by Ithaca Peripherals to help adjust and test the printer. There is no guarantee that these commands are valid and/or stable. They are not intended for use by the end user. In no case, should this command sequence be sent to the printer by an application.

Control Codes Summary by Code

Normal ASCII	Second ASCII Field	Hex Code	IPCL Equivalent Code	Description	Page
[NUL]		00		Null	
[SOH]	<addr>	01H		Multidrop control	54
[ENQ]	<n>	05H		Inquire status (Refer to command descriptions)	57
[HT]		09H		Horizontal tab	25
[LF]		0AH	&%LF	Line feed	23
[FF]		0CH	&%FF	Form feed	28
[CR]		0DH	&%CR	Carriage return	23
[SO]4		0EH	&%MW	One-line double-wide	38
[SI]		0FH	&%F1	Set 17 cpi	35
[DC2]		12H	&%F3	Set 10 cpi	35
[DC4]		14H	&%MN	Cancel one-line double-wide	38
[CAN]		18H	&%RP	Clear print buffer	52
[ESC]		1BH	&%	Begin escape sequence	
[SP]2		20H		Space character	
<32> ... <255>		20H - 0FFH		Printable characters	
[ESC]	[EM] B <n>	1BH,19H, 42H	&%BH <m^1>	Bar code height n = 0 Restore Defaults n = 1 to 9 Number of passes (0.11” per pass)	51
[ESC]	* <m><n>[1] <n>[2]	1BH,2AH		Print Epson 9-pin graphics in mode <m>	46
[ESC]	! <n>	1BH,21H	&%CS <m^1><m^2><m^3><m^3>	Select International Character Set	31
[ESC]	- <n>	1BH,2DH	&%CU {n=0} &%MU {n=1}	Underline n = 0 End n = 1 Begin	39
[ESC]	0	1BH,30H	&%ST	Set 1/8" line space	27
[ESC]	1	1BH,31H	&%SG	Set 7/72" line space	27
[ESC]	2	1BH,32H		Begin variable line spacing (Enable [ESC] A n)	28
[ESC]	3 <n>	1BH,33H	&%SV <m^1><m^2><m^3>	Set fine line space n/216 inch where n = 1..255 defines feed used by line feed.	27
[ESC]	5 <n>	1BH,35H	&%CA {n=0} &%MA {n=1}	Set auto line feed n = 0 End n = 1 Begin	28
[ESC]	:	1BH,3AH	&%F2	Set 12 cpi	35
[ESC]	<	1BH,3CH	&%PT	Print suppress and pass through	53
[ESC]	? <m><n>	1BH,3FH		Reassign graphics mode	46

Normal ASCII	Second ASCII Field	Hex Code	IPCL Equivalent Code	Description	Page
[ESC]	A <n>	1BH,41H		Set variable line spacing n/72 inch (n = 1..85) (Enabled by [ESC] 2)	28
[ESC]	D <n>^{1} <n>^{2} <n>^{3}. . . <n>^{k}<0>	1BH,44H		Horizontal tab set (Set tabs at columns n^1 n^2 ... n^k 0). The maximum value of n depends on the station selected.	25
[ESC]	E	1BH,45H	&%MM	Begin emphasized print (half speed)	40
[ESC]	F	1BH,46H	&%CM	End emphasized print	40
[ESC]	G	1BH,47H	&%ME	Begin enhanced print (double pass)	40
[ESC]	H	1BH,48H	&%CE	End enhanced print	40
[ESC]	J <n>	1BH,4AH	&%FM <m^1><m^2><m^3>	Do a fine line feed n/216 inch n = 0 no line feed n = 1..255	27
[ESC]	K <n>^{1} <n>^{2}	1BH,4BH		Single-density graphics n1 = 0..255 n2 = 0..3 len = n1 +256*n2	45
[ESC]	L <n>^{1} <n>^{2}	1BH,4CH		Double-density half-speed graphics n1 = 0..255 n2 = 0..3 len = n1 + 256*n2	45
[ESC]	P <n>	1BH,50H	&%RI {n=2} &%RF {n=1} &%RN {n=0}	Rotated font n = 0 Normal n = 1 Rotated 90°, 7 x 9 n = 2 Rotated 270°, 7 x 9 n = 5 Rotated 90°, 5 x 7 n = 7 Rotated 270°, 5 x 7	37
[ESC]	R	1BH,52H	&%HV	Reset horizontal tabs to defaults	25
[ESC]	V <n>	1BH,56H		Set intercharacter spacing	36
[ESC]	W <n>	1BH,57H	&%FS {n=0} &%FD {n=1} &%FH {n=3}	Multiline double-wide double-high sequence n = 0 End all n = 1 Begin double-wide n = 2 Double-high n = 3 Both	38
[ESC]	X <n_1> <n_2>	1BH,58H		Set left and right margin n1 = Left in characters n2 = Right in characters	
[ESC]	Y <n>^{1} <n>^{2}	1BH,59H		Double-density full-speed graphics n1 = 0..255 n2 = 0..3 len = n1 +256 * n2	45

Normal ASCII	Second ASCII Field	Hex Code	IPCL Equivalent Code	Description	Page
[ESC]	Z <n>1 <n>2	1BH,5AH		Quad-density full-speed graphics n1 = 0..255 n2 = 0..3 len = n1 +256 * n2	45
[ESC]	[@ ...	1BH,5BH, 40H		Set print style (See command description).	39
[ESC]	[P <n>	1BH,5BH, 50H	&%F1-7	Set character pitch	35
[ESC]	[T <n>	1BH,5BH, 54H	&%CP	Set character set by code page.	32
[ESC]	^<n>	1BH,5EH	&%CC	Print control code	33
[ESC]	a <n>	1BH,61H	&%JR &%JC &%JL	Set justification to n = 0 Left n = 1 Center n = 2 Right	26
[ESC]	b <n> ... [ETX]	1BH,62H	&%25 {n=0} &%39 {n=1} &%12 {n=2} &%UP {n=3} &%EA {n=4}	Print Bar code n = 0 Interleave 2 of 5 n = 1 Code 39 n = 2 Code 128 n = 3 UPC A n = 4 EAN-13	50
[ESC]	d <n>	1BH,64H	&%FL	Feed <n> lines at the current spacing	28
[ESC]	g <n>	1BH,67H	&%GP {n=0} &%GS {n=1} &%GE {n=2} &%GW {n=3}	Graphic save buffer control where n = 0 Print buffer n = 1 Clear and start save n = 2 End save n = 3 End save and store to nonvolatile memory	49
[ESC]	q <n>	1BH,71H	None	Buffer marker query	52
[ESC]	r <n>	1BH,72H	&%R0 {n=0} &%R1 {n=1} &%R2 {n=2} &%R3 {n=3}	Rotated print n = 0 End n = 1 Rotated by 90° n = 2 Rotate left 180° n = 3 Rotate by 270° **NOTE:** Other font and format options are available.	42
[ESC]	v	1BH,76H	&%FC	Cycle receipt cutter	53
[ESC]	w <n>	1BH,77H		Enable dynamic response	62
[ESC]	x <n>	1BH,78H	&%D1 {n=1} &%D2 {n=2}	Open cash drawer n = 1 Cash Drawer 1 n = 2 Cash Drawer 2	53
[ESC]	y <n>	1BH,79H	&%Y0 – 9	Control diagnostics and extended features (See description).	54
[GS]	<n>	1DH,7FH		Diagnostic commands	63

Chapter 8:
Epson/Axiohm Commands

Emulation Modes

The OKIPOS 80 Plus III thermal printer is capable of emulating an Epson TM-T8x series printer and Axiohm 7193 printer as well as its Ithaca modes. Though the Epson TM-8x and Axiohm 7193 share many of the same commands, they do not all produce the same results. Therefore, to ensure complete compatibility, the OKIPOS 80 Plus III must be configured specifically for either Epson TM-T8x emulation or Axiohm 7193 emulation. The current emulation mode can be obtained at any time by performing a self-test and may be changed at any time via the Configuration Mode.

Command Name **[*Origin*]**

Command Name is the name of the command.
Origin specifies which printer command set the command comes from.
Origin may take on any combination of the following values:

- **E** = Epson TM-T8x command set
- **A** = Axiohm 7193 command set
- **I** = OKIPOS 80 Plus III command extension
- ***** = Command has different functions depending upon the current emulation mode

Supported Commands

Print and Feed Commands			
Command		**Name**	**Page**
LF	0AH	Print and line feed	71
ETB	17H	Print	71
CR	0DH	Print and carriage return	71
ESC J	1BH, 4AH	Print and feed paper *n* vertical units	71
ESC d	1BH, 64H	Print and feed *n* lines	72
DC4	14H	Feed *n* print lines	72
NAK	15H	Feed *n* dot rows	72
FF	0CH	Print and return to standard mode (in page mode)	72
ESC FF	1BH, 0CH	Print data in page mode	72
Line Spacing Commands			
Command		**Name**	**Page**
ESC 2	1BH, 32H	Select default line spacing, 1/6 lpi	73
ESC 3	1BH, 33H	Set line spacing	73
SYN	16H	Add *n* extra dot rows	73
User-defined Image Commands			
GS -	1DH, 2DH	Define user-defined bit image	74
GS .	1DH, 2EH	Define user-defined bit image from a PCX file	75
GS 0	1DH, 30H	Print user-defined bit image	76
GS 5	1DH, 35H	Erase all user-defined bit images	76
GS *	1DH, 2AH	Define single user-defined bit image	76
GS /	1DH, 2FH	Print single user-defined bit-image	77
Character Commands			
Command		**Name**	**Page**
ESC SP	1BH, 20H	Set right-side character spacing	78
ESC %	1BH, 25H	Select/cancel user-defined character sets	78
ESC &	1BH, 26H	Define user-defined characters	79
ESC ?	1BH, 3FH	Cancel user-defined characters	79
ESC R	1BH, 52H	Select an international character set	80
ESC [T	1BH, 5BH, 54H	Select character code table	81
GS #	1DH, 23H	Insert Euro	81
ESC ^	1BH, 5EH	Print control character	82
ESC t	1BH, 74H	Select character code table	82
ESC !	1BH, 21H	Select print mode(s)	82
ESC -	1BH, 2DH	Turn underline mode on/off	83
ESC E	1BH, 45H	Turn emphasized mode on/off	83
ESC G	1BH, 47H	Turn double-strike mode on/off	83
ESC {	1BH, 7BH	Turn upside-down printing mode on/off	83
ESC V	1BH, 56H	Turn 90° rotation mode on/off	84
ESC DC2	1BH, 12H	Turn 90° counterclockwise rotation mode on/off	84
GS !	1DH, 21H	Select character size	84

GS B	1DH, 42H	Turn white/black reverse printing mode on/off	85
DC2	12H	Select double-wide characters	85
DC3	13H	Select single-wide characters	85
ESC SYN	1BH, 16H	Select pitch (column width)	85
CAN	18H	Cancel print data in page mode	86
Panel Button Commands			
Command		**Name**	**Page**
ESC c 5	1BH, 63H, 35H	Enable/disable panel buttons	86
Paper Sensor Commands			
Command		**Name**	**Page**
ESC c 3	1BH, 63H, 33H	Select paper sensor(s) to output paper end signals	86
ESC c 4	1BH, 63H, 34H	Select paper sensor(s) to stop printing	86
Print Position Commands			
Command		**Name**	**Page**
ESC $	1BH, 24H	Set absolute print position	87
ESC \	1BH, 5CH	Set relative print position	87
ESC a	1BH, 61H	Select justification	87
HT	09H	Set horizontal tab positions	88
ESC D	1BH, 44H	Set horizontal tab positions	88
GS L	1DH, 4CH	Set left margin	88
GS W	1DH, 57H	Set printing area width	88
ESC DC4	1BH, 14H	Set column	89
ESC W	1BH, 57H	Set printing area in page mode	89
ESC T	1BH, 54H	Select print direction in page mode	89
GS $	1DH, 24H	Set absolute vertical print position in page mode	90
GS \	1DH, 5CH	Set absolute vertical print position in page mode	90
Bit-image Commands			
Command		**Name**	**Page**
ESC *	1BH, 2AH	Select bit-image mode	91
ESC K	1BH, 4BH	Select 8-dot single-density bit-image mode	92
ESC L	1BH, 4CH	Select 8-dot double-density bit-image mode	92
ESC Y	1BH, 59H	Select 8-dot double-density bit-image mode	92
Status Commands			
Command		**Name**	**Page**
GS a	1DH, 61H	Enable/Disable Automatic Status Back (ASB)	93
GS r	1DH, 72H	Transmit status	95
DLE EOT	10H, 04H	Real-time status transmission	96
ESC u[4]	1BH, 75H	Transmit peripheral device status	98
ESC u[5]	1BH, 75H	Request alternate status	98
ESC u 0[6]	1BH, 75H	Transmit cash drawer status	98

[4] The command has different functions depending upon the current emulation mode.
[5] The command has different functions depending upon the current emulation mode.
[6] The command has different functions depending upon the current emulation mode.

ESC v	1BH, 76H	Transmit printer status (Axiohm)	99
ESC v	1BH, 76H	Transmit printer status (Epson)	99
Bar Code Commands			
Command		**Name**	**Page**
GS h	1DH, 68H	Set bar code height	100
GS w	1DH, 77H	Set bar code width	100
GS k	1DH, 6BH	Print bar code	100
GS H	1DH, 48H	Select printing position of HRI characters	102
GS f	1DH, 66H	Select font HRI characters	102
Macro Function Commands			
Command		**Name**	**Page**
GS :	1DH, 3AH	Start/end macro definition	102
GS ^	1DH, 5EH	Execute macro	103
GS _	1DH, 5FH	Delete start-up macro definition	103
Mechanism Control Commands			
Command		**Name**	**Page**
GS V	1DH, 56H	Select cut mode and cut paper	104
ESC i	1BH, 69H	Partial knife cut	104
EM	19H	Full knife cut	104
SUB	1AH	Partial knife cut	104
BEL	07H	Sound buzzer	104
ESC BEL	1BH, 07H	Sound buzzer	105
Miscellaneous Commands			
Command		**Name**	**Page**
GS P	1DH, 50H	Set horizontal and vertical motion units	106
ESC @	1BH, 40H	Initialize printer	106
DLE	10H	Clear printer	106
GS I	1DH, 49H	Transmit printer ID	107
ESC p	1BH, 70H	Generate pulse	107
ESC =	1BH, 3DH	Set peripheral device	108
DLE ENQ	10H, 05H	Real-time request to printer	108
ESC ‘	1BH, 27H	Copy user defined storage buffers	109
ESC L	1BH, 4CH	Select page mode	109
ESC S	1BH, 53H	Select standard mode	109

Command Descriptions

Print and Feed Commands

Function **Print and line feed** [EA]
ASCII LF
Hexadecimal 0AH
Decimal <10>
Description This command prints the data in the print buffer and feeds one line based on the current line spacing.

Function **Print** [A]
ASCII ETB
Hexadecimal 17H
Decimal <23>
Description This command prints one line from the buffer and feeds paper one line at the current line height (functions same as a LF command).

Function **Print and carriage return** [EA]
ASCII CR
Hexadecimal 0DH
Decimal <13>
Default
[*Epson TM-T8x*] CR is ignored.
[*Axiohm 7193*] This command functions the same as LF.
Description The table below describes the operation of the LF command based upon its default setting in configuration mode.

Paper	Automatic line feed enabled	Automatic line feed disabled
Paper roll	Functions same as LF	Ignored

Function **Print and feed paper** [EA]
ASCII ESC J *n*
Hexadecimal 1BH 4AH *n*
Decimal <27> <74> *n*
Range $0 \le n \le 255$
Description This command prints the data in the print buffer and feeds the paper [*n* × vertical motion unit]. When standard mode is selected, the vertical motion unit set by GS P is used. When page mode is selected, the vertical or horizontal motion unit set by GS P is used for the print direction set by ESC T.

Function	**Print and feed *n* lines**		[EA]
ASCII	ESC	d	*n*
Hexadecimal	1BH	64H	*n*
Decimal	<27>	<100>	*n*
Range	$0 \le n \le 255$		
Description	This command prints the data in the print buffer and feeds *n* lines.		

Function	**Feed *n* print lines**		[A]
ASCII	DC4	*n*	
Hexadecimal	14H	*n*	
Decimal	<20>	*n*	
Range	$0 \le n \le 255$		
Description	This command feeds the paper *n* lines at the current line height without printing.		

Function	**Feed *n* dot rows**		[A]
ASCII	NAK	*n*	
Hexadecimal	15H	*n*	
Decimal	<21>	*n*	
Range	$0 \le n \le 255$		
Description	This command feeds the paper *n* dot rows [*n* × vertical motion unit] inches without printing.		

Function	**Print and return to standard mode (in page mode)**		[E]
ASCII	FF		
Hexadecimal	0CH		
Decimal	<12>		
Description	FF prints the data in the print buffer collectively and returns to standard mode. The buffer data is deleted after it is printed. This command returns the values set by the ESC W command to the default values. The value set by the ESC T command is maintained. This command is enabled only in page mode. This command does not cut the paper.		

Function	**Print data in page mode**		[E]
ASCII	ESC	FF	
Hexadecimal	1BH	0CH	
Decimal	<27>	<12>	
Description	ESC FF prints all buffered data in the printable area collectively, in page mode. This command is enabled only in page mode. After printing, the printer does not clear the buffered data or values set by other commands. When the printer returns to standard mode, FF or ESC S should be executed. This command does not cut the paper.		

Line Spacing Commands

Function **Select default line spacing** [EA]
ASCII ESC 2
Hexadecimal 1BH 32H
Decimal <27> <50>
Description This command sets the line spacing to 1/6 inch.

Function **Set line spacing** [EA]
ASCII ESC 3 *n*
Hexadecimal 1BH 33H *n*
Decimal <27> <51> *n*
Range $0 \le n \le 255$
Description
[*Epson TM-T8x*] This command sets the line spacing to [*n* × vertical motion unit].
[*Axiohm 7193*] This command sets the line spacing to [*n* × (1/360")].
When standard mode is selected, the vertical motion unit set by GS P is used. When page mode is selected, the vertical or horizontal motion unit set by GS P is used for the print directions set by ESC T.

Function **Add *n* extra dot rows** [A]
ASCII SYN *n*
Hexadecimal 16H *n*
Decimal <22> *n*
Range $0 \le n \le 12$
Default
[*TM-T8x*] *n* = 23, 6 lines/inch with vertical motion unit = 1/360.
[*Axiohm*] *n* = 2, 7.6 lines/inch with vertical motion unit = 1/152.
Description This command adds *n* extra dot row [*n* x vertical motion unit] to the character height to increase space between print lines or decrease the number of lines per inch.
The table below shows the relationship between the number of lines per inch and each extra dot row added in Axiohm 7193 emulation mode with the vertical motion unit set to 1/152 inch.

Extra Rows	Lines per Inch	Dot Row
0	8.5	18
1	8.0	19
2	7.6	20
3	7.2	21
4	7.0	22
5	6.6	23
6	6.3	24
7	6.1	25
8	5.9	26
9	5.6	27
10	5.4	28
11	5.2	29
12	5.1	30

User Defined Image Commands

Function	**Define user-definable bit image**		[E]
ASCII	GS	-	<*name*> 0 *x y d1 . . . d*(*x* x *y* x 8)
Hexadecimal	1DH	2DH	<*name*> 0 *x y d1 . . . d*(*x* x *y* x 8)
Decimal	<29>	<45>	<*name*> 0 *x y d1 . . . d*(*x* x *y* x 8)
Range	$1 \le x \le 255$		
	$1 \le y \le 255$		
	$0 \le d \le 255$		
	<*name*> = a 15-byte maximum length name to identify the image.		

Description

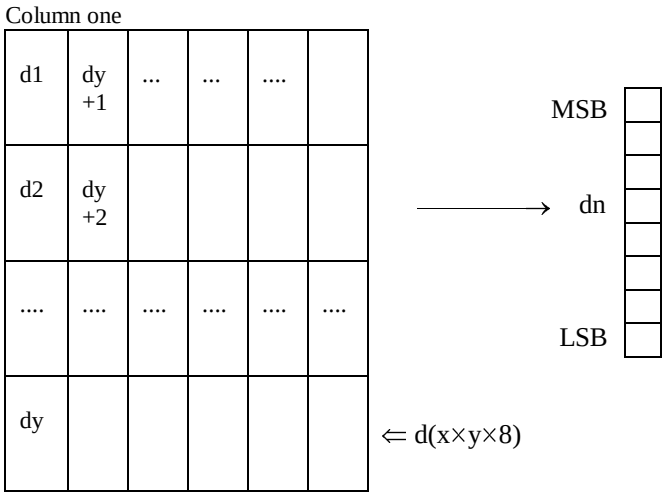
GS - defines a bit-image for storage in the nonvolatile memory pool. The printer maintains an area of memory specifically designated for multiple bit-image storage. This area can contain as many bit-images as its size permits. (A printout of the amount of nonvolatile memory remaining can be obtained by performing a printer self-test.) Each image is uniquely identified by the name given to it by the <*name*> parameter.

The name of the bit-image can be from one to 15 bytes long and contain any alphanumeric characters as well as the space. The format of the bit-image is identical to that defined by the GS * command.

The GS - command must be entered in standard mode only at the beginning of a print line. If this command is entered in page mode, it will be ignored. If the size of the image is larger than the space remaining in the nonvolatile buffer, the image will not be saved. When the last byte of bit-image data is received and there is ample space in the nonvolatile buffer for the bit-image, the bit image will be saved. While the save is in process, the printer will go off-line and will not respond to or save any data it receives. When the save is complete, the printer will return on-line. Please be sure to adhere to flow-control provided by the communications interface.

The following basic example demonstrates how to define an 8 bit x 8 bit block with the name “MY IMAGE”:

A representation of the format of a downloaded bit-image is depicted below:



```
PRINT #1, CHR$(29),CHR$(45),                                  REM  Enter the GS - command
PRINT #1, ”MY IMAGE”,CHR$(0);                                 REM  Define the image name
PRINT #1, CHR$(1),CHR$(1);                                    REM  Image size (8 x  8 bits)
PRINT #1, CHR$(255),CHR$(255),CHR$(255),CHR$(255);  REM  Send 8 bytes of image
PRINT #1, CHR$(255),CHR$(255),CHR$(255),CHR$(255)   REM  data
```

Function	**Define user-defined bit image from a PCX file**		[E]
ASCII	GS	.	<*name*> 0 <*PCX graphics file*>
Hexadecimal	1DH	2EH	<*name*> 0 <*PCX graphics file*>
Decimal	<29>	<46>	<*name*> 0 <*PCX graphics file*>
Range	<*name*> = a 15-byte maximum length name to identify the image.		
Description	GS . defines a bit-image for storage in the nonvolatile memory pool. (See GS - command for more information). The source of the bit-image is a PCX file. GS . will accept PCX file versions 2.5, 2.8, and 3.0. If the PCX file contains an extended palette structure, this command will be aborted; any PCX file defined with more than 16 usable colors uses an extended palette structure. All colors within a standard palette will be converted to either black or white when the bit-image is stored using a “best match” algorithm. The definition of the <*name*> parameter and the description of operation are identical to the GS - command.		

Function	**Print user-defined bit image** [E]				
ASCII	GS	0	<*name*> 0		
Hexadecimal	1DH	30H	<*name*> 0		
Decimal	<29>	<48>	<*name*> 0		
Range	<*name*> = a 15-byte maximum length name to identify the image.				
Description	GS 0 prints a bit-image from storage in the nonvolatile memory pool. The name of the bit-image can be from one to 15 bytes long and contain any alphanumeric characters as well as spaces. GS . searches the nonvolatile memory pool for the first occurrence of the image identified by <*name*>. If the image is found, it will be printed. If the image cannot be found, this command will be ignored. In standard mode, this command must be entered at the beginning of a print line. In page mode, this command may be entered at any time.				

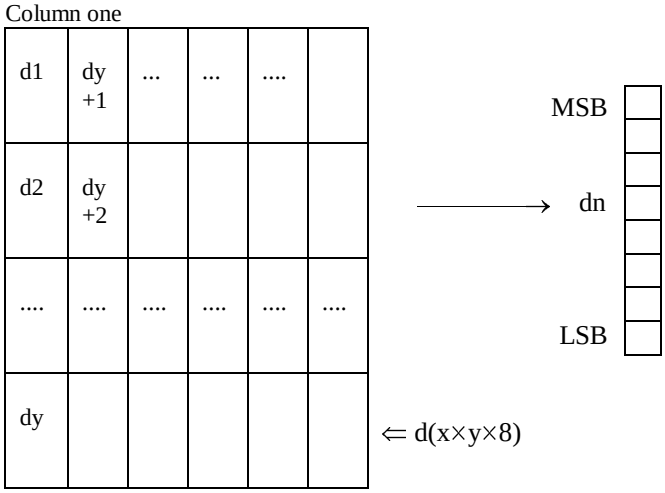
The following basic example demonstrates how to print the stored bit-image named “MY IMAGE”:

```
PRINT #1, CHR$(29), CHR$(48),        REM  Enter the GS 0
command
PRINT #1, “MY IMAGE”, CHR$(0)        REM  Enter the image name
```

Function	**Erase all user-defined bit images** [E]				
ASCII	GS	5			
Hexadecimal	1DH	35H			
Decimal	<29>	<53>			
Description	GS 5 erases the entire contents of the nonvolatile memory pool and frees up the memory for new bit-image definitions. Bit images cannot be deleted individually. The printer will go off-line when this command is received and will return on-line when it is completed. Please be sure to adhere to flow-control provided by the communication interface.				

Function	**Define single user-definable bit-image** [EA]				
ASCII	GS	*	*x*	*y*	*d1…d*(*x* x *y* x 8)
Hexadecimal	1DH	2AH	*x*	*y*	*d1…d*(*x* x *y* x 8)
Decimal	<29>	<42>	*x*	*y*	*d1…d*(*x* x *y* x 8)
Range	$1 \le x \le 255$ $1 \le y \le 48$ $0 \le d \le 255$				
Description	This command defines a single downloaded bit-image using the number of dots specified by *x* and *y* in the RAM buffer area (volatile memory). The number of dots in the horizontal direction is *x* x 8. The number of dots in the vertical direction is *y* x 8. If (*x* x *y* x 8) exceeds the size of the buffer, the image will be truncated. *d* indicates bit-image data. Data (*d*) specifies a bit printed to 1 and not printed to 0. After a downloaded bit-image is defined, it may be saved to the nonvolatile EEPROM storage buffer using the ESC ‘ command where it will remain indefinitely. Otherwise, the image will remain in the RAM buffer where it is available until ESC @ or ESC & is executed; the printer is reset; or the power is turned off.				

A representation of the format of a downloaded bit-image is depicted below:



Function **Print single user-definable bit-image** [EAI]

ASCII GS / *m*

Hexadecimal 1DH 2FH *m*

Decimal <29> <47> *m*

Description This command prints a downloaded or stored bit-image using the mode specified by *m*. *m* selects a mode from the table below:

Mode Table				
Hex	**Decimal**	**Mode**	**Vertical Dot Density (dpi)**	**Horizontal Dot Density (dpi)**
00	0	Normal	203	203
01	1	Double-width	203	101
02	2	Double-height	101	203
03	3	Quadruple	101	101

Character Commands

Function **Set right-side character spacing** [EA]

ASCII	ESC	SP	*n*
Hexadecimal	1BH	20H	*n*
Decimal	<27>	<32>	*n*

Range $0 \le n \le 255$

Description This command sets the character spacing for the right side of the character to [*n* × horizontal motion unit]. When standard mode is selected, the vertical motion unit set by GS P is used. When page mode is selected, the vertical or horizontal motion unit set by GS P is used for the print directions set by ESC T.

Function **Select/cancel user-defined character sets** [EA]

ASCII	ESC	%	*n*
Hexadecimal	1BH	25H	*n*
Decimal	<27>	<37>	*n*

Range See table below.

Description This command selects or cancels a user-defined character set as defined below.

Table of *n*		
Hex	**Decimal**	**Function**
00	0	Selects Code Page 437 and turns off user defined set
01	1	Selects user defined character set in the RAM buffer
02	2	Selects Code Page 850 and turns off user defined set
41	65	Selects user defined character set in nonvolatile EEPROM buffer

If the user defined character set in RAM is selected and the set does not exist, an empty set will be created. Any user defined bit-image will be erased. Any characters referenced that are not defined will be replaced as follows: equivalent Code Page 437 character in Axiohm 7193 emulation and equivalent current code page character in Epson TM-T8x emulation.

If the user defined character set in the nonvolatile EEPROM buffer is selected and the set does not exist, this command will be ignored. (See the GS ‘ command for saving a user defined character set in the RAM buffer to the nonvolatile EEPROM buffer).

Function	**Define user-defined characters** [EA]					
ASCII	ESC	&	*y*	*c1*	*c2*	[*x1 d1...d*(*y* × *x1*)]...[*xk d1...d*(*y* × *xk*)]
Hexadecimal	1BH	26H	*y*	*c1*	*c2*	[*x1 d1...d*(*y* × *x1*)]...[*xk d1...d*(*y* × *xk*)]
Decimal	<27>	<38>	*y*	*c1*	*c2*	[*x1 d1...d*(*y* × *x1*)]...[*xk d1...d*(*y* × *xk*)]

Range

$y = 3$

$0 \le x \le 13$ Font A (13 × 24)

$0 \le x \le 10$ Font B (10 × 24)

$0 \le d1 \ldots d(y \times xk) \le 255$

$k = c2 - c1 + 1$

[*Axiohm 7193*] $32 \le c1 \le c2 \le 254$

[*Epson TM-T8x*] $32 \le c1 \le c2 \le 126$

Description

This command defines user-defined characters.

y specifies the number of bytes in the vertical direction.

c1 specifies the beginning character code for the definition.

c2 specifies the final code.

x specifies the number of dots in the horizontal direction.

d is the dot data for the characters. The dot pattern is in the horizontal direction from the left side. Any remaining dots on the right side are blank.

The allowable character code range differs between Epson and Axiohm emulation. See Range above.

The data to define a user-defined character is (*y* × *x*) bytes.

Set a corresponding bit to 1 to print a dot or 0 to not print a dot.

In Epson emulation mode, there is a unique user defined character set for each pitch. In Axiohm emulation mode, both pitches share the same user defined character set.

Function	**Cancel user-defined characters** [E]		
ASCII	ESC	?	*n*
Hexadecimal	1BH	3FH	*n*
Decimal	<27>	<63>	*n*

Range

[*Axiohm 7193*] $32 \le n \le 254$

[*Epson TM-T8x*] $32 \le n \le 126$

Description

This command cancels user-defined characters.

Function **Select an international character set** [E]

ASCII ESC R *n*

Hexadecimal 1BH 52H *n*

Decimal <27> <82> *n*

Range $0 \le n \le 74$

Default $n = 0$

Description This command selects an international character set, *n*, from the following table.

Country	Epson ID	Country	Epson ID	Country	Epson ID
ASCII	0	Swiss II	20	Windows Greek	50
French	1	Cyrillic II-866	21	Latin 5 (Windows Turkey)	51
German	2	Polska Mazovia	22	Windows Cyrillic	52
British	3	ISO Latin 2	23	Hungarian CWI	54
Danish I	4	Serbo Croatic I	24	Kamenicky (MJK)	55
Swedish I	5	Serbo Croatic II	25	ISO Latin 4 (8859/4)	56
Italian	6	Multilingual	26	Turkey_857	57
Spanish I	7	Norway	27	Roman-8	58
Japanese	8	Portugal	28	Hebrew NC (862)	60
Norwegian	9	Turkey	29	Hebrew OC	61
Danish II	10	Greek 437	38	Windows Hebrew	62
Spanish II	11	Greek 928	39	KBL- Lithuanian	63
Latin American	12	Greek 437 CYPRUS	41	Publisher	64
French Canadian	13	ECMA-94	42	Ukrainian	66
Dutch	14	Canada French	43	ISO Latin 6 (8859/10)	67
Swedish II	15	Cyrillic I-855	44	Windows Baltic	68
Swedish III	16	Cyrillic II-866	45	Cyrillic-Latvian	69
Swedish IV	17	East Europe Latin II-852	46	Bulgarian	72
Turkish	18	Greek 869	47	Icelandic-861	73
Swiss I	19	Windows East Europe	49	Baltic 774	74

Function **Select character code table** [EAI]

ASCII ESC [T n_H n_L

Hexadecimal 1BH 5BH 54H n_H n_L

Decimal <27> <91> <84> n_H n_L

Default n_H = 1, n_L = 181 (Code Page 437)

Description This command selects a code page, *n*, from the character code table.

Code Page	Country	Decimal <n_h> <n_l>	Hex <n_h> <n_l>	Code Page	Country	Decimal <n_h> <n_l>	Hex <n_h> <n_l>
64	USA (Slashed 0)	0,64	0H,040H	865	Norway	3,97	3H,061H
65	USA (Unslashed 0)	0,65	0H,041H	866	Cyrillic II-866	3,98	3H,062H
66	British	0,66	0H,042H	869	Greek 869	3,101	3H,065H
67	German	0,67	0H,043H	874	Thailand	3,106	3H,06AH
68	French	0,68	0H,044H	895	Kamenicky (MJK)	3,127	3H,07FH
69	Swedish I	0,69	0H,045H	1008	Greek 437	3,240	3H,0F0H
70	Danish	0,70	0H,046H	1009	Greek 928	3,241	3H,0F1H
71	Norwegian	0,71	0H,047H	1011	Greek 437 CYPRUS	3,243	3H,0F3H
72	Dutch	0,72	0H,048H	1012	Turkey	3,244	3H,0F4H
73	Italian	0,73	0H,049H	1013	Cyrillic II-866	3,245	3H,0F5H
74	French Canadian	0,74	0H,04AH	1014	Polska Mazovia	3,246	3H,0F6H
75	Spanish	0,75	0H,04BH	1015	ISO Latin 2	3,247	3H,0F7H
76	Swedish II	0,76	0H,04CH	1016	Serbo Croatic I	3,248	3H,0F8H
77	Swedish III	0,77	0H,04DH	1017	Serbo Croatic II	3,249	3H,0F9H
78	Swedish IV	0,78	0H,04EH	1018	ECMA-94	3,250	3H,0FAH
79	Turkish	0,79	0H,04FH	1019	Windows East Europe	3,251	3H,0FBH
80	Swiss I	0,80	0H,050H	1020	Windows Greek	3,252	3H,0FCH
81	Swiss II	0,81	0H,051H	1021	Latin 5 (Windows Turkey)	3,253	3H,0FDH
90	Publisher	0,90	0H,05AH	1022	Windows Cyrillic	3,254	3H,0FEH
91	Welsh	0,91	0H,05BH	1024	Hungarian CWI	4,0	4H,000H
437	USA	1,181	1H,0B5H	1026	ISO Latin 4 (8859/4)	4,2	4H,002H
774	Baltic 774	3,6	3H,006H	1027	Ukrainian	4,3	4H,003H
850	Multilingual	3,82	3H,052H	1028	Roman-8	4,4	4H,004H
852	East Europe Latin II-852	3,84	3H,054H	1029	ISO Latin 6 (8859/10)	4,5	4H,005H
855	Cyrillic I-855	3,87	3H,057H	1030	Hebrew NC (862)	4,6	4H,006H
857	Turkey 857	3,89	3H,059H	1031	Hebrew OC	4,7	4H,007H
858	Multilingual Euro	3,90	3H,05AH	1032	Windows Hebrew	4,8	4H.008H
860	Portugal	3,92	3H,05CH	1033	KBL- Lithuanian	4,9	4H,009H
861	Icelandic-861	3,93	3H,05DH	1034	Windows Baltic	4,10	4H,00AH
862	Hebrew NC (862)	3,94	3H,05EH	1035	Cyrillic-Latvian	4,11	4H,00BH
863	Canada French	3,95	3H,05FH	1072	Bulgarian	4,48	4H,030H

Function **Insert Euro Character** [EA]

ASCII GS # *n*

Hexadecimal 1DH 23H

Decimal <29> <35>

Description This command allows an application to replace any character in the currently active character set with the Euro character. The character to be replaced is defined by *n*. For example, if the currently active character set is CP 850 (multilingual) and the 0D5H character is to be the Euro character, 1DH 23H will replace the character at 0D5H with the Euro symbol.

Function **Print control character**

ASCII ESC ^ *n*

Hexadecimal 1BH 5EH *n*

Decimal <27> <94> *n*

Range $0 \le n \le 255$

Description This command allows characters from zero to 31 codes to be printed. During normal operation, characters from zero to 31 are control characters. This command turns off control code translation for character *n.*

Function **Select character code table** [E]

ASCII ESC t *n*

Hexadecimal 1BH 74H *n*

Decimal <27> <116> *n*

Range $0 \le n \le 5$, $n = 255$

Default $n = 0$

Description This command selects a page, *n,* from the character code table.

n	Character Code Table
0	Page 0 [PC437 (U.S.A. and Standard Europe)]
1	Page 1 [PC850 (Multilingual)]
2	Page 2 [PC850 (Multilingual)]
3	Page 3 [PC860 (Portuguese)]
4	Page 4 [PC863 (Canadian-French)]
5	Page 5 [PC865 (Nordic)]
255	Page 255 [Space page]

Function **Select print mode(s)** [EA]

ASCII ESC ! *n*

Hexadecimal 1BH 21H *n*

Decimal <27> <33> *n*

Range $0 \le n \le 255$

Description This command selects print mode(s) using n as follows.

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Character Font A (13 × 24)
	On	01	1	Character Font B (10 × 24)
1, 2	-	-	-	Undefined
3	Off	00	0	Emphasized mode not selected
	On	08	8	Emphasized mode selected
4	Off	00	0	Double-height mode not selected
	On	10	16	Double-height mode selected
5	Off	00	0	Double-width mode not selected
	On	20	32	Double-width mode selected
6	-	-	-	Undefined
7	Off	00	0	Underline mode not selected
	On	80	128	Underline mode selected

Function **Turn underline mode on/off** [E]
ASCII ESC - *n*
Hexadecimal 1BH 2DH *n*
Decimal <27> <45> *n*
Range $0 \le n \le 2, 48 \le n \le 50$
Description This command turns underline mode on or off, based on the following values of *n*.

n	Function
0, 48	Turns off underline mode
1, 49	Turns on underline mode (2-dots thick)
2, 50	Turns on underline mode (2-dots thick)

Function **Turn emphasized mode on/off** [E]
ASCII ESC E *n*
Hexadecimal 1BH 45H *n*
Decimal <27> <69> *n*
Range $0 \le n \le 255$
Description This command turns emphasized mode on or off. When the LSB is 0, emphasized mode is turned off. When the LSB is 1, emphasized mode is turned on.

Function **Turn double-strike mode on/off** [E]
ASCII ESC G *n*
Hexadecimal 1BH 47H *n*
Decimal <27> <71> *n*
Range $0 \le n \le 255$
Description This command turns double-strike mode on or off. When the LSB is 0, double-strike mode is turned off. When the LSB is 1, double-strike mode is turned on.

Function **Turn upside-down printing mode on/off** [E]
ASCII ESC { *n*
Hexadecimal 1BH 7BH *n*
Decimal <27> <123> *n*
Range $0 \le n \le 255$
Description This command turns upside-down printing mode on or off. When the LSB is 0, upside-down printing mode is turned off. When the LSB is 1, upside-down mode is turned on. In Axiohm 7193 emulation mode, counterclockwise rotation, ESC DC2, is turned off when upside-down printing mode is turned on. In standard mode, this command is enabled only when input at the beginning of a line. In page mode, an internal flag is activated and this command is enabled when the printer returns to standard mode.

Function **Turn 90° rotation mode on/off** [EAI]
ASCII ESC V *n*
Hexadecimal 1BH 56H *n*
Decimal <27> <86> *n*
Range *n* = 0, 1, 2, 48, 49, 50
Description This command turns 90° clockwise rotation mode on/off and is enabled only in standard mode. In page mode, an internal flag is activated, and this command is enabled when the printer returns to standard mode.

n	Function
0, 48	Turns off all rotation modes
1, 49	Turns on 90° clockwise rotation mode
2, 50	Turns on 90° counterclockwise rotation mode

Function **Turn 90° counterclockwise rotation mode on/off** [A]
ASCII ESC DC2
Hexadecimal 1BH 12H
Decimal <27> <18>
Description This command rotates characters 90° counterclockwise. It remains in effect until the printer is reset or until a clear printer (10), set/cancel upside-down print (1B 7B), or set/cancel rotated print (1B 56) command is received. This command is enabled only in standard mode. In page mode, an internal flag is activated, and this command is enabled when the printer returns to standard mode.

Function **Select character size** [E]
ASCII GS ! *n*
Hexadecimal 1DH 21H *n*
Decimal <29> <33> *n*
Range $0 \le n \le 255$
($1 \le$ vertical number of times ≤ 8, $1 \le$ horizontal number of times ≤ 8)
Description This command selects the character height using Bits 0 to 2 and selects the character width using Bits 4 to 7, as follows.

Character Height Selection

Hex	Decimal	Height
00	0	1 (normal)
01	1	2 (double-high)
02	2	3
03	3	4
04	4	5
05	5	6
06	6	7
07	7	8

Character Width Selection

Hex	Decimal	Width
00	0	1 (normal)
10	16	2 (double-wide)
20	32	3
30	48	4
40	64	5
50	80	6
60	96	7
70	112	8

Function **Turn white/black reverse printing mode on/off** [E]
ASCII GS B *n*
Hexadecimal 1DH 42H *n*
Decimal <29> <66> *n*
Range $0 \le n \le 255$
Description This command turns on or off white/black reverse printing mode. When the LSB is 0, white/black reverse mode is turned off. When the LSB is 1, white/black reverse mode is turned on.

Function **Select double-wide characters** [A]
ASCII DC2
Hexadecimal 12H
Decimal <18>
Description This command prints double-wide characters. The printer is reset to single-wide mode after a line has been printed or a Clear Printer (10) command is received.

Function **Select single-wide characters** [A]
ASCII DC3
Hexadecimal 13H
Decimal <19>
Description This command prints single-wide characters.

Function **Select pitch (column width)** [A]
ASCII ESC SYN *n*
Hexadecimal 1BH 16H *n*
Decimal <27> <22> *n*
Range 0 = Standard (44 col/15.61 cpi)
1 = Compressed (57 col/20.3 cpi)
Default *n* = 0
Description This command selects the character pitch for a print line. See Appendix B for a description of both pitches.

Function **Cancel print data in page mode** [E]
ASCII CAN
Hexadecimal 18H
Decimal <24>
Description CAN deletes all the print data for the current print job in page mode. This command is enabled only in page mode.

Panel Button Commands

Function **Enable/disable panel buttons** [EA]

ASCII	ESC	c	5	*n*
Hexadecimal	1BH	63H	35H	*n*
Decimal	<27>	<99>	<53>	*n*

Range $0 \le n \le 255$
Description This command enables or disables the panel buttons. When the LSB is 0, the panel buttons are enabled. When the LSB is 1, the panel buttons are disabled. In Epson TM-T8x emulation mode, the ESC @ command will reenable the panel buttons.

Paper Sensor Commands

Function **Select paper sensor(s) to output paper end signals** [E]

ASCII	ESC	c	3	*n*
Hexadecimal	1BH	63H	33H	*n*
Decimal	<27>	<99>	<51>	*n*

Range $0 \le n \le 255$
Description This command selects the paper sensor(s) to output paper end signals and is only available with a parallel interface. It is ignored with a serial interface.

Each bit of *n* is used as follows.

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Ignored
	On	01	1	Ignored
1	Off	00	0	Ignored
	On	02	2	Ignored
2	Off	00	0	Paper roll end sensor disabled
	On	04	4	Paper roll end sensor enabled
3	Off	00	0	Paper roll end sensor disabled
	On	08	8	Paper roll end sensor enabled
4-7	-	-	-	Undefined

Function **Select paper sensor(s) to stop printing** [E]

ASCII	ESC	c	4	*n*
Hexadecimal	1B	63H	34H	*n*
Decimal	<27>	<99>	<52>	*n*

Range $0 \le n \le 255$
Description This command is not supported and is ignored if received.

Print Position Commands

Function	**Set absolute print position**			[EA]
ASCII	ESC	$	*nL*	*nH*
Hexadecimal	1BH	24H	*nL*	*nH*
Decimal	<27>	<36>	*nL*	*nH*
Range	$0 \le nL \le 255$			
	$0 \le nH \le 255$			
Description	This command sets the print starting position from the beginning of the line.			
[*Epson TM-T8x*]	The distance in dots from the beginning of the line to the print position is [(*nL* + *nH* × 256) × (horizontal motion unit)]. When standard mode is selected, the horizontal motion unit set by GS P is used. When page mode is selected, the horizontal or vertical motion unit set by GS P is used for the print direction set by ESC T.			
[*Axiohm 7193*]	If nongraphics follow this command, the distance in dots from the beginning of the line to the print position is [(*nL* + *nH* × 256) × (horizontal motion unit)]. If graphics follow this command, the distance in dots from the beginning of the line to the print position is [(*nL*+*nH*×256) × (horizontal motion unit)]/2.			

Function	**Set relative print position**			[EA]
ASCII	ESC	\	*nL*	*nH*
Hexadecimal	1BH	5CH	*nL*	*nH*
Decimal	<27>	<92>	*nL*	*nH*
Range	$0 \le nL \le 255$			
	$0 \le nH \le 255$			
Description	This command sets the print starting position based on the current position and the distance from the current position to [(*nL* + *nH* × 256) × horizontal unit]. When standard mode is selected, the horizontal motion unit set by GS P is used. When page mode is selected, the horizontal or vertical motion unit set by GS P is used for the print direction set by ESC T.			

Function	**Select justification**			[EA]
ASCII	ESC	a	*n*	
Hexadecimal	1BH	61H	*n*	
Decimal	<27>	<97>	*n*	
Range:	$0 \le n \le 2, 48 \le n \le 50$			
Description	This command aligns all the data in one line to the specified position *n*. In standard mode, this command is enabled only when input at the beginning of a line. In page mode, an internal flag is activated, and this command is enabled when the printer returns to standard mode.			

n	**Justification**
0, 48	Left
1, 49	Center
2, 50	Right

Function	**Horizontal tab** [EA]			
ASCII	HT			
Hexadecimal	09H			
Decimal	<9>			
Description	This command moves the print position to the next horizontal tab position, if that position exists.			

Function	**Set horizontal tab positions** [EA]			
ASCII	ESC	D	*n1 ... nk*	NUL
Hexadecimal	1BH	44H	*n1 ... nk*	00
Decimal	<27>	<68>	*n1 ... nk*	0
Range	$1 \le n \le 255$			
	$0 \le k \le 32$			
Default	Default is every eight characters for 13 × 24 font.			
Description	This command sets horizontal tab positions.			
Where	*n* specifies the column number for setting a horizontal tab position from the beginning of the line.			
	k indicates the total number of horizontal tab positions to be set.			
	Epson and Axiohm emulation modes treat tab positions differently depending upon factors such as character pitch, expansion, and rotation.			

Function	**Set left margin** [E]			
ASCII	GS	L	*nL*	*nH*
Hexadecimal	1DH	4CH	*nL*	*nH*
Decimal	<29>	<76>	*nL*	*nH*
Range	$0 \le nL \le 255$			
	$0 \le nH \le 255$			
Description	This command sets the left margin using *nL* and *nH*. The left margin is set to [(*nL* + *nH* × 256) × horizontal motion unit)] from the beginning of the line. In standard mode, this command is enabled only when input at the beginning of a line. In page mode, an internal flag is activated and this command is enabled when the printer returns to standard mode.			

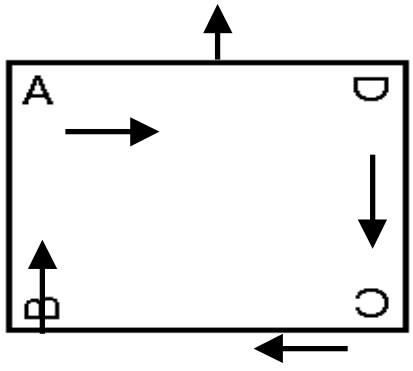
Function	**Set printing area width** [E]			
ASCII	GS	W	*nL*	*nH*
Hexadecimal	1DH	57H	*nL*	*nH*
Decimal	<29>	<87>	*nL*	*nH*
Range	$0 \le nL \le 255$			
	$0 \le nH \le 255$			
Description	The printing area width is set to [(*nL* + *nH* × 256) × horizontal motion unit)] from the left margin. In standard mode, this command is enabled only when input at the beginning of a line. In page mode, an internal flag is activated, and this command is enabled when the printer returns to standard mode.			

Function	**Set column**		[A]
ASCII	ESC	DC4	*n*
Hexadecimal	1BH	14H	*n*
Decimal	<27>	<20>	*n*
Range	$1 \le n \le 44$ (Standard pitch) $1 \le n \le 57$ (Compressed pitch)		
Description	This command prints the first character of the next print line in column *n*. It must be sent for each line not printed at column one. The value of *n* is set to one after each line.		

Function	**Set printing area in page mode**		[E]
ASCII	ESC	W	$x_L x_H y_L y_H dx_L dx_H dy_L dy_H$
Hexadecimal	1BH	57H	$x_L x_H y_L y_H dx_L dx_H dy_L dy_H$
Decimal	<27>	<87>	$x_L x_H y_L y_H dx_L dx_H dy_L dy_H$
Range	$0 \le x_L, x_H, y_L, y_H, dx_L, dx_H, dy_L, dy_H \le 255$ (except for $dx_L = dx_H = 0$ or $dy_L = dy_H = 0$)		
Description	ESC W sets the size and position of the printing area in page mode as follows: Horizontal starting position = $[(x_L + x_H \times 256) \times$ (horizontal motion unit)] Vertical starting position = $[(y_L + y_H \times 256) \times$ (vertical motion unit)] Printing area width = $[(dx_L + dx_H \times 256) \times$ (horizontal motion unit)] inches Printing area height = $[(dy_L + dy_H \times 256) \times$ (vertical motion unit)] inches The default settings are as follows: $x_L = x_H = y_L = y_H = 0$ and $dx_L = 0$, $dx_H = 2$, $dy_L = 126$, $dy_H = 6$ This command is enabled only in page mode. If this command is entered in standard mode, an internal flag is activated, and the command is enabled when the printer selects page mode.		

Function	**Set print direction in page mode**		[E]
ASCII	ESC	T	*n*
Hexadecimal	1BH	54H	*n*
Decimal	<27>	<84>	*n*
Range	$0 \le n \le 3$, $48 \le n \le 51$		
Description	ESC T *n* sets the print direction and starting position in page mode specified by *n* as shown below. The default setting is *n* = 0. This command is enabled only in page mode. If this command is entered in standard mode, an internal flag is activated, and the command is enabled when the printer returns to page mode.		

n	Print Direction	Starting Position
0, 48	Left to right	Upper left (A in figure)
1, 49	Bottom to top	Lower left (B in figure)
2, 50	Right to left	Lower right (C in figure)
3, 51	Top to bottom	Upper right (D in figure)



The parameters for the horizontal or vertical motion units (*x or y*) differ depending on the starting position of the printing area as follows:

If the starting position is the upper left or lower right of the printing area
(*n* = 0, 2, 48, or 50), then these commands use
1) Horizontal motion units, ESC SP, ESC $, and ESC \
2) Vertical motion units, ESC 3, ESC J, GS $, and GS \

If the starting position is the upper right or lower left of the printing area
(*n* = 1, 3, 49, or 51), then these commands use
1) Horizontal motion units, ESC 3, ESC J, GS $, and GS \
2) Vertical motion units, ESC SP, ESC $, and ESC \

Function	**Set absolute vertical print position in page mode**			[E]
ASCII	GS	$	n_L	n_H
Hexadecimal	1DH	24H	n_L	n_H
Decimal	<29>	<36>	n_L	n_H
Range	$0 \le n_L \le 255$			
	$0 \le n_H \le 255$			
Description	GS $ n_L n_H sets the absolute vertical print starting position for buffer character data in page mode to [($n_L + n_H \times 256$) × (vertical or horizontal motion unit)] inches. This command is effective only in page mode.			

Function	**Set absolute vertical print position in page mode**			[E]
ASCII	GS	\	n_L	n_H
Hexadecimal	1DH	5CH	n_L	n_H
Decimal	<29>	<92>	n_L	n_H
Range	$0 \le n_L \le 255$			
	$0 \le n_H \le 255$			
Description	GS \ n_L n_H moves the vertical print position in page mode to [($n_L + n_H \times 256$) × (vertical or horizontal motion unit)] inches from the current position. This command is effective only in page mode. Use the complement of N for setting pitch movement upward: -N pitch = 65536 - N, where N = ($n_L + n_H \times 256$). The horizontal and vertical motion units use the horizontal and vertical values set by the GS P command.			

Bit-Image Commands

Function **Select bit-image mode** [EA]

ASCII	ESC	*	*m*	*nL*	*nH*	*d1*
... *k*						
Hexadecimal	1BH	2AH	*m*	*nL*	*nH*	*d1*
... *k*						
Decimal	<27>	<42>	*m*	*nL*	*nH*	*d1*
... *k*						

Range

$m = 0, 1, 32, 33$

$0 \le nL \le 255$

$0 \le nH \le 3$

$0 \le d \le 255$

Description This command selects a bit-image mode using *m* for the number of dots specified by *nL* and *nH*, as follows.

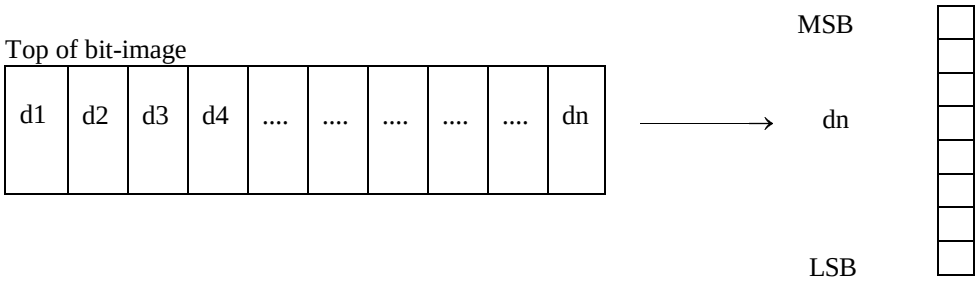
		Vertical Direction		Horizontal Direction	
m	**Mode**	**Number of Dots**	**Density (dpi)**	**Density (dpi)**	**Amount of Data (K)**
0	8-dot single-density	8	68	102	nL + nH × 256
1	8-dot double-density	8	68	203	nL + nH × 256
32	24-dot single-density	24	203	102	(nL + nH × 256) × 3
33	24-dot double-density	24	203	203	(nL + nH × 256) × 3

The *nL* and *nH* indicate the number of dots of the bit image in the horizontal direction. The number of dots is calculated by *nL* + *nH* × 256.

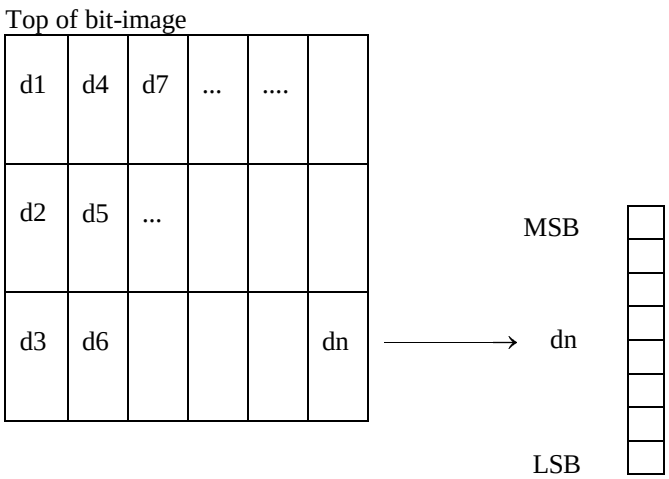
If the bit-image data input exceeds the number of dots to be printed on a line, the excess data is ignored.

d indicates the bit-image data. Set a corresponding bit to 1 to print a dot or to 0 to not print a dot.

8-dot single-density mode representation is depicted below:



24-dot single-density mode representation is depicted below:



Function	**Select 8-dot single-density bit-image mode**				[A]
ASCII	ESC	K	*nL*	*nH*	*d1 ... k*
Hexadecimal	1BH	4BH	*nL*	*nH*	*d1 ... k*
Decimal	<27>	<75>	*nL*	*nH*	*d1 ... k*
Description	See ESC * for a complete description of graphics mode commands.				

Function	**Select 8-dot double-density bit-image mode**				[A]
ASCII	ESC	L	*nL*	*nH*	*d1 ... k*
Hexadecimal	1BH	4CH	*nL*	*nH*	*d1 ... k*
Decimal	<27>	<76>	*nL*	*nH*	*d1 ... k*
Usage	Axiohm 7193 emulation mode				
Description	See ESC * for a complete description of graphics mode commands.				

Function	**Select 8-dot double-density bit-image mode**				[A]
ASCII	ESC	Y	*nL*	*nH*	*d1 ... k*
Hexadecimal	1BH	59H	*nL*	*nH*	*d1 ... k*
Decimal	<27>	<89>	*nL*	*nH*	*d1 ... k*
Description	See ESC ***** for a complete description of graphics mode commands.				

Status Commands

Function **Enable/Disable Automatic Status Back (ASB)** [E]

ASCII GS a *n*

Hexadecimal 1DH 61H *n*

Decimal <29> <97> *n*

Range $0 \le n \le 255$

Default $n = 0$

Description This command enables or disables ASB. ASB is enabled if any item is selected. The printer automatically generates a 4-byte status message whenever the status changes. Multiple status items can be selected. When $n = 0$, ASB is disabled. If ASB is enabled when the printer is disabled by the ESC = command, the printer transmits a 4-byte status message whenever the status changes. The status items are selected using *n* as follows.

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Drawer kick-out connector status disabled
	On	01	1	Drawer kick-out connector status enabled
1	Off	00	0	On-line/off-line status disabled
	On	02	2	On-line/off-line status enabled
2	Off	00	0	Error status disabled
	On	04	4	Error status enabled
3	Off	00	0	Paper roll sensor status disabled
	On	08	8	Paper roll sensor status enabled
4-7	-	-	-	Undefined

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Not used; fixed to Off
1	Off	00	0	Not used; fixed to Off
2	Off	00	0	Drawer 1 or 2 kick-out connector status is low.
	On	04	4	Drawer 1 or 2 kick-out connector status is high.
3	Off	00	0	On-line
	On	08	8	Off-line
4	On	10	16	Not used; fixed to On
5	Off	00	0	Cover closed
	On	20	32	Cover opened
6	Off	00	0	Paper is not being fed by the paper feed button.
	On	40	64	Paper is being fed by the paper feed button.
7	Off	00	0	Not used; fixed to Off

First byte (Printer information)

Bit	Off/On	Hex	Decimal	Status for ASB
0-2	-	-	-	Undefined
3	Off	00	0	No auto-cutter error
	On	08	8	Auto-cutter error occurred
4	Off	00	0	Not used; fixed to Off
5	Off	00	0	No unrecoverable error
	On	20	32	Unrecoverable error occurred
6	Off	00	0	No automatically recoverable error occurred
	On	40	64	Automatically recoverable error occurred
7	Off	00	0	Not used; fixed to Off

Second byte (error information)

Bit	Off/On	Hex	Decimal	Status for ASB
0,1	-	-	-	Not used; fixed to Off
2,3	Off	00	0	Paper roll sensor: paper present
	On	0C	12	Paper roll sensor: paper not present
4	Off	00	0	Not used; fixed to Off
5,6	-	-	-	Undefined
7	Off	00	0	Not used; fixed to Off

Third byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Status for ASB
0-3	-	-	-	Undefined
4	Off	00	0	Not used; fixed to Off
5,6	-	-	-	Undefined
7	Off	00	0	Not used; fixed to Off

Fourth byte (paper sensor information)

Function **Transmit status** [E]

ASCII GS r *n*

Hexadecimal 1DH 72H *n*

Decimal <29> <114> *n*

Range $1 \le n \le 2, 49 \le n \le 50$

Description This command transmits the status specified by n as follows.

n	Function
1, 49	Transmits paper sensor status
2, 50	Transmits drawer kick-out connector status

Bit	Off/On	Hex	Decimal	Status
0,1	-	-	-	Not used; fixed to Off
2,3	Off	00	0	Paper roll sensor: paper present
	On	0C	12	Paper roll sensor: paper not present
4	Off	00	0	Not used; fixed to Off
5,6	-	-	-	Undefined
7	Off	00	0	Not used; fixed to Off

Paper sensor status (*n* = 1, 49)

Bit	Off/On	Hex	Decimal	Status
0	Off	00	0	Drawer 1 or 2 connector status is low.
	On	01	1	Drawer 1 or 2 connector status is high.
1-3	-	-	-	Undefined
4	Off	00	0	Not used; fixed to Off
5,6	-	-	-	Undefined
7	Off	00	0	Not used; fixed to Off

Drawer kick-out connector status (*n* = 2, 50)

Function **Real-time status transmission** [E*]

ASCII DLE EOT *n*

Hexadecimal 10H 04H *n*

Decimal <16> <4> *n*

Range $1 \le n \le 4$

Usage Epson TM-T8x emulation mode only.

Description This command transmits the selected printer status specified by *n* in real time, according to the following parameters.

n	Function
1	Transmit printer status
2	Transmit off-line status
3	Transmit error status
4	Transmit paper roll sensor status

Bit	Off/On	Hex	Decimal	Status
0	Off	00	0	Not used; fixed to Off
1	Off	02	2	Not used; fixed to On
2	Off	00	0	Drawer 1 or 2 kick-out connector status is low.
	On	04	4	Drawer 1 or 2 kick-out connector status is high.
3	Off	00	0	On-line
	On	08	8	Off-line
4	On	10	16	Not used; fixed to On
5,6	-	-	-	Undefined
7	Off	00	0	Not used; fixed to Off

Printer status (*n* = 1)

Bit	Off/On	Hex	Decimal	Status
0	Off	00	0	Not used; fixed to Off
1	On	02	2	Not used; fixed to On
2	Off	00	0	Cover is closed.
	On	04	4	Cover is open.
3	Off	00	0	Paper is not being fed by the FEED button.
	On	08	8	Paper is being fed by the FEED button.
4	On	10	16	Not used; fixed to On
5	Off	00	0	No paper-end stop
	On	20	32	Printing stops due to paper-end.
6	Off	00	0	No error
	On	40	64	Error occurred
7	Off	00	0	Not used; fixed to Off

Off-line status (*n* = 2)

Bit	Off/On	Hex	Decimal	Status
0	Off	00	0	Not used; fixed to Off
1	On	02	2	Not used; fixed to On
2	-	-	-	Undefined
3	Off	00	0	No auto-cutter error
	On	08	8	Auto-cutter error occurred
4	On	10	16	Not used; fixed to On
5	Off	00	0	No unrecoverable error
	On	20	32	Unrecoverable error occurred
6	Off	00	0	No automatically recoverable error occurred
	On	40	64	Automatically recoverable error occurred
7	Off	00	0	Not used; fixed to Off

Error status (*n* = 3)

Bit	Off/On	Hex	Decimal	Status
0	Off	00	0	Not used; fixed to Off
1	On	02	2	Not used; fixed to On
2, 3	Off	00	0	Paper roll near-end sensor: paper adequate.
	On	0C	12	Paper roll near-end sensor: paper near end.
4	On	10	16	Not used; fixed to On
5, 6	Off	00	0	Paper roll end sensor: paper present
	On	60	96	Paper roll end sensor: paper not present
7	Off	00	0	Not used; fixed to Off

Paper roll sensor status (*n* = 4)

Function **Transmit peripheral device status** [E*]
ASCII ESC u *n*
Hexadecimal 1BH 75H *n*
Decimal <27> <117> *n*
Range *n* = 0, 48
Usage *Epson TM-T8x emulation mode definition.
Description This command transmits the status of the drawer kick-out connector as a byte when *n* = 0 or 48. This command allows the host to determine the status of a peripheral device.

Bit	Off/On	Hex	Decimal	Status
0	Off	00	0	Drawer 1 or 2 connector status is low.
	On	01	1	Drawer 1 or 2 connector status is high.
1-3	-	-	-	Undefined
4	Off	00	0	Not used; fixed to Off
5,6	-	-	-	Undefined
7	Off	00	0	Not used; fixed to Off

Function **Request alternate status** [A]
ASCII ESC u *n*
Hexadecimal 1BH 75H *n*
Decimal <27> <117> *n*
Range See table below.
Usage Axiohm 7193 emulation mode definition, parallel printer
Description This command sends status data to the host system and is available only on parallel printers. It is intended for situations when the host computer requires status but is not capable of IEEE 1284 bidirectional communications. When this command is sent to the printer, the printer waits until all the data in the input buffer has been processed. The paper exhaust line then shows the status for the cash drawer or receipt paper as follows.

n	Function	Description
00	Drawer 1	High = Open Low = Closed or not present
01	Drawer 2	High = Open Low = Closed or not present
02	Paper low (not implemented)	High = Paper low Low = Not used
03	Paper out	High = Paper out (default) Low = Not used
>03	Ignored, no change	Printer does not stay BUSY.[1]

[1] Paper exhaust line is valid to indicate previously requested status.

Function **Transmit cash drawer status** [A*]
ASCII ESC u 0
Hexadecimal 1BH 75H 0
Decimal <27> <117> 0
[Usage] *Axiohm 7193 mode definition, serial printer
Description This command transmits current status of the cash drawers. One byte is sent to the host system. If a drawer is not connected, the status will indicate closed.

Bit	1 Signifies	0 Signifies
0	Drawer 1 closed	Drawer 1 open
1	Drawer 2 closed	Drawer 2 open

Function **Transmit printer status** [A]
ASCII ESC v
Hexadecimal 1BH 76H
Decimal <27> <118>
Description This command sends one byte of status data to the host system. The printer will always respond with a NULL character (00 Hex) indicating a no fault condition. If the printer has one of the error conditions indicated in the table below, it will go busy and not respond.

Bit	Status	0 Signifies
0	Receipt paper	Present
1	Receipt cover	Closed
2	Receipt paper	Present
3	Knife	OK
4	Not used	
5	Print head	OK
6	Input voltage	OK
7	Not used	

Function **Transmit printer status** [E]
ASCII ESC v
Hexadecimal 1BH 76H
Decimal <27> <118>
Description This command transmits the status of the paper sensor as 1 byte of data. When the paper roll end sensor detects a paper-end, the printer goes off-line and does not execute this command until the paper-end condition is corrected.

Bit	Off/On	Hex	Decimal	Status
0,1	-	-	-	Not used; fixed to Off
2,3	Off	00	0	Paper roll sensor: paper present
	On	0C	12	Paper roll sensor: paper not present
4	Off	00	0	Not used; fixed to Off
5,6	-	-	-	Undefined
7	Off	00	0	Not used; fixed to Off

Bar code Commands

Function **Set bar code height** [EA]

ASCII	GS	h	*n*
Hexadecimal	1DH	68H	*n*
Decimal	<29>	<104>	*n*

Range $1 \le n \le 255$

Default

[*Epson TM-T8x*] 0.90 inches high

[*Axiohm 7193*] 1.06 inches high

Description This command sets the height of the bar code. Bar code height is set to *n*/180 inches in Epson emulation mode. Bar code height is set to *n*/152 inches in Axiohm emulation mode.

Function **Set bar code width** [EA]

ASCII	GS	w	*n*
Hexadecimal	1DH	77H	*n*
Decimal	<29>	<119>	*n*

Range $1 \le n \le 6$

Default $n = 3$

Description This command sets the horizontal side of the bar code. *n* specifies the bar code width as follows.

n	Module Width (mm) for Multilevel Bar Code	Binary-level Bar Code	
	Thin element width (mm)		Thick element width (mm)
1	0.125	0.125	0.375
2	0.250	0.250	0.625
3	0.375	0.375	1.000
4	0.500	0.500	1.250
5	0.625	0.625	1.625
6	0.750	0.750	2.000

Multilevel bar codes are UPC A, UPC E, JAN-13 (EAN-13), JAN-8 (EAN-8), Code 93, and Code 128. Binary-level bar codes are Code 39, ITF, and Codabar.

Function **Print bar code** [EA]

[1]ASCII	GS	k	*m*	*d1...dk*	NUL
Hexadecimal	1DH	6BH	*m*	*d1...dk*	00
Decimal	<29>	<107>	*m*	*d1...dk*	0
[2]ASCII	GS	k	*m*	*n*	*d1...dn*
Hexadecimal	1DH	6BH	*m*	*n*	*d1...dn*
Decimal	<29>	<107>	*m*	*n*	*d1...dn*

Range [1] $0 \le m \le 6$ (*k* and *d* depends on the bar code system used.)

[2] $65 \le m \le 73$ (*n* and *d* depends on the bar code system used.)

Description This command selects a bar code system and prints the bar code.

m selects a bar code system as follows.

m		Bar Code System	Number of Characters	Remarks
[1]	0	UPC A	11 ≤ k ≤ 12	48 ≤ d ≤ 57
[1]	1	UPC E	11 ≤ k ≤ 12	48 ≤ d ≤ 57
[1]	2	JAN-13 (EAN-13)	12 ≤ k ≤ 13	48 ≤ d ≤ 57
[1]	3	JAN-8 (EAN-8)	7 ≤ k ≤ 8	48 ≤ d ≤ 57
[1]	4	Code 39	1 ≤ k	48 ≤ d ≤ 57, 65 ≤ d ≤ 90 d = 32, 36, 37, 43, 45, 46, 47
[1]	5	ITF	1 ≤ k (even number)	48 ≤ d ≤ 57
[1]	6	Codabar	1 ≤ k	48 ≤ d ≤ 57, 65 ≤ d ≤ 68 d = 32, 36, 37, 43, 45, 46, 47, 58
[2]	65	UPC A	11 ≤ k ≤ 12	48 ≤ d ≤ 57
[2]	66	UPC E	11 ≤ k ≤ 12	48 ≤ d ≤ 57
[2]	67	JAN-13 (EAN-13)	12 ≤ k ≤ 13	48 ≤ d ≤ 57
[2]	68	JAN-8 (EAN-8)	7 ≤ k ≤ 8	48 ≤ d ≤ 57
[2]	69	Code 39	1 ≤ n ≤ 255	48 ≤ d ≤ 57, 65 ≤ d ≤ 90 d = 32, 36, 37, 43, 45, 46, 47
[2]	70	ITF	1 ≤ n ≤ 255 (even number)	48 ≤ d ≤ 57
[2]	71	Codabar	1 ≤ n ≤ 255	48 ≤ d ≤ 57, 65 ≤ d ≤ 68 d = 32, 36, 37, 43, 45, 46, 47, 58
[2]	72	Code 93	1 ≤ n ≤ 255	0 ≤ d ≤ 127
[2]	73	Code 128	2 ≤ n ≤ 255	0 ≤ d ≤ 127

[Description for [1]] *d* indicates the character code to be printed.

A null (00 Hex) character ends the bar code definition.

[Description for [2]] *n* indicates the number of bytes of bar code data to be processed immediately following *n*.

d indicates the character code to be printed.

The following apply to both GS *k m d1...dk* NUL and GS *k m n d1...dn*:

1) If the horizontal width exceeds the printing area, the printer only feeds the paper.

2) These commands feed as much paper as necessary to print the bar code according to the GS h command.

3) These commands are enabled only when no data exists in the print buffer. When data does exist in the print buffer, the printer processes the data following *m* as normal data.

4) After printing a bar code, the print position is set at the beginning of the line.

5) These commands are not effected by print modes (emphasized, underline, character size...), except for upside-down mode.

Function **Select printing position of HRI characters** [EA]
ASCII GS H *n*
Hexadecimal 1DH 48H *n*
Decimal <29> <72> *n*
Range $0 \le n \le 3, 48 \le n \le 51$
Description This command selects the printing position of HRI (Human Readable Interpretation) characters when printing a bar code. *n* selects the printing position as follows.

n	Printing position
0, 48	Not printed
1, 49	Above bar code
2, 50	Below bar code
3, 51	Both above and below the bar code

Function **Select font for HRI characters** [E]
ASCII GS f *n*
Hexadecimal 1DH 66H *n*
Decimal <29> <102> *n*
Range *n* = 0, 1, 48, 49
Description This command selects a font for the HRI (Human Readable Interpretation) characters used when printing a bar code. *n* selects a font from the following table.

n	Font
0, 48	Font A (13 × 24)
1, 49	Font B (10 × 24)

Macro Function Commands

Function **Start/end macro definition** [E]
ASCII GS :
Hexadecimal 1DH 3AH
Decimal <29> <58>
Description: This command starts or ends macro definition. Macro definition starts when this command is received during normal operation and ends when it is received during the macro definition. The macro definition can contain up to 2048 bytes. If the definition exceeds this value, the excess data is not stored.

Function	**Execute macro** [EI]				
ASCII	GS	^	*r*	*t*	*m*
Hexadecimal	1DH	5EH	*r*	*t*	*m*
Decimal	<29>	<94>	*r*	*t*	*m*
Range	$0 \le r \le 255$				
	$0 \le t \le 255$				
	m = See below				

Description This command executes a macro definition.

r specifies the number of times to execute the macro. When Bit 1 of *m* is set, *r* is ignored, and the macro is executed infinitely.

t specifies the waiting time for executing the macro; it is $t \times 100$ msec for every macro execution.

m specifies macro executing mode.

When the LSB of *m* = 0, the macro executes r times continuously with interval specified by *t*.

When the LSB of *m* = 1, after waiting for the period specified by *t*, the printer remains idle and waits for the FEED button to be pressed. After the button is pressed, the printer executes the macro once. The printer repeats this operation *r* times.

When Bit 5 of *m* is set, the current macro definition is saved into the printer's nonvolatile EEPROM memory as a start-up macro without executing it. This macro definition will be executed upon power-up using the parameters specified by this command. If the printer is powered-up into self-test mode, the macro definition will not be executed. A saved macro definition can be deleted with the GS _ command.

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Macro executes *r* times continuously with the interval specified by *t.*
	On	01	1	FEED button controlled operation with time interval *t*
1-4	-	-	-	Undefined
5	On	20	32	Value given by *r* is ignored and macro is run infinitely.
6	On	40	64	Save start-up macro definition to EEPROM memory without executing
7	-	-	-	Undefined

Function	**Delete start-up macro definition**	[I]
ASCII	GS	_
Hexadecimal	1DH	5FH
Decimal	<29>	<95>

Description This command deletes a start-up macro definition previously created by the GS ^ command. If a start-up macro was not previously defined, this command is ignored.

Mechanism Control Commands

Function **Select cut mode and cut paper** [E]

[1]ASCII	GS	V	*m*	
Hexadecimal	1DH	56H	*m*	
Decimal	<29>	<86>	*m*	
[2]ASCII	GS	V	*m*	*n*
Hexadecimal	1DH	56H	*m*	*n*
Decimal	<29>	<86>	*m*	*n*

Range [1]*m* = 1, 49

[2]*m* = 65, 66, 0 ≤ *n* ≤ 255

Description This command selects a mode for cutting paper and executes paper cutting. The value of m selects the mode as follows:

m	Print mode
1, 49	Partial cut
65, 66	Feeds paper (cutting position + [n × (vertical motion unit)]), and performs a partial cut

Function **Partial knife cut** [EA]

ASCII ESC i

Hexadecimal 1BH 69H

Decimal <27> <105>

Description This command performs a partial knife cut.

Function **Full knife cut** [EA]

ASCII EM

Hexadecimal: 19H

Decimal <25>

Description This command is implemented the same as partial knife cut, ESC i.

Function **Partial knife cut** [A]

ASCII SUB

Hexadecimal 1AH

Decimal <26>

Description This command performs a partial knife cut.

Function **Sound buzzer** [EAI]

ASCII BEL

Hexadecimal 07H

Decimal <07>

Description This command sounds the internal buzzer, if equipped, for 550 milliseconds.

Function	**Sound buzzer**	[EA]
ASCII	ESC	BEL
Hexadecimal	1BH	07H
Decimal	<27>	<07>
Description	This command sounds the internal buzzer, if equipped, for 550 milliseconds.	

Miscellaneous Commands

Function	**Set horizontal and vertical motion units**			[E]
ASCII	GS	P	*x*	*y*
Hexadecimal	1DH	50H	*x*	*y*
Decimal	<29>	<80>	*x*	*y*
Range	$0 \le x \le 255$			
	$0 \le y \le 255$			
Default				
[*Epson TM-T8x*]	$x = 180$, $y = 360$			
[*Axiohm 7193*]	$x = 152$, $y = 152$			
Description	This command sets the horizontal and vertical motion units to 1/*x* inches and 1/*y* inches, respectively. When *x* and *y* are set to 0, the default setting of each value is used.			

Function	**Initialize printer**		[EA]
ASCII	ESC	@	
Hexadecimal	1BH	40H	
Decimal	<27>	<64>	
Description	This command clears the data in the print buffer and resets the printer to the mode that was in effect when the power was turned on.		

Function	**Clear printer**	[A*]
ASCII	DLE	
Hexadecimal	10H	
Decimal	<16>	
Usage	Axiohm 7193 emulation mode only.	
Description	This command clears the print line buffer without printing and sets the printer to the following conditions. Double-wide (12 dec) command is canceled. Line spacing, pitch, and user-defined character sets and bit-images in RAM are unaffected. Single-wide, single-high, nonrotated, and left-aligned characters are set. The printer is restarted, and error status is cleared in a fault condition. This command also returns paper exhaust to the paper status if an alternate status has been requested using the ESC u command (parallel interface only).	

Function **Transmit printer ID** [E]
ASCII GS I *n*
Hexadecimal 1DH 49H *n*
Decimal <29> <73> *n*
Range $1 \le n \le 3, 49 \le n \le 51$
Description This command transmits the printer ID specified by *n* as follows.

n	Printer ID	Specification	ID (HEX)
1, 49	Printer model ID	Epson TM-T88/T88P	20
		Epson TM-T85	08
		Axiohm 7193	71
2, 50	Type ID	See table below.	
3, 51	ROM version ID	Not implemented, returns zero.	

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used; fixed to Off
1	On	02	2	Auto-cutter equipped
2, 3	-	-	-	Undefined
4	Off	00	0	Not used; fixed to Off
5, 6	-	-	-	Undefined
7	Off	00	0	Not used; fixed to Off

***n* = 2, Type ID**

Function **Generate pulse** [EA]
ASCII ESC p *m* *t1* *t2*
Hexadecimal 1BH 70H *m* *t1* *t2*
Decimal <27> <112> *m* *t1* *t2*
Range $m = 0, 1, 48, 49$
$0 \le t1 \le 255$
$0 \le t2 \le 255$
Description This command outputs the pulse specified by *t1* and *t2* to connector Pin m as follows: Pulse ON time = (*t1* * 2 ms). Pulse OFF time = (*t2* * 2 ms).

m	Connector pin
0, 48	Drawer 1 kick-out connector Pin 5.
1, 49	Drawer 2 kick-out connector Pin 1 (J9 2-3) configurable to Pin 5 via jumper (J9 1-2).

Function **Set peripheral device** [EA]

ASCII ESC = *n*

Hexadecimal 1BH 3DH *n*

Decimal <27> <61> *n*

Range $1 \le n \le 255$

Description This command selects a device to which the host computer sends data, using *n* as follows.

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Printer disabled
	On	01	1	Printer enabled
1-7	-	-	-	Undefined

When the printer is disabled, it ignores all received data with the exception of the ESC =, DLE ENQ 1, and DLE ENQ 2 commands.

If ASB is enabled when the printer is disabled by the ESC = command, the printer transmits a 4-byte status message whenever the status changes.

Function **Real-time request to printer** [E*]

ASCII DLE ENQ *n*

Hexadecimal 10H 05H *n*

Decimal <16> <5> *n*

Range $1 \le n \le 2$

Usage Epson TM-T8x emulation mode only.

Description This command responds to a request from the host computer specified by *n*. When an auto-cutter error occurs, the printer can attempt to recover from it by using this command without turning the printer off.

n	Request
1	Recover from an error, and restart printing from the line where the error occurred.
2	Recover from an error after clearing the receive and print buffers.

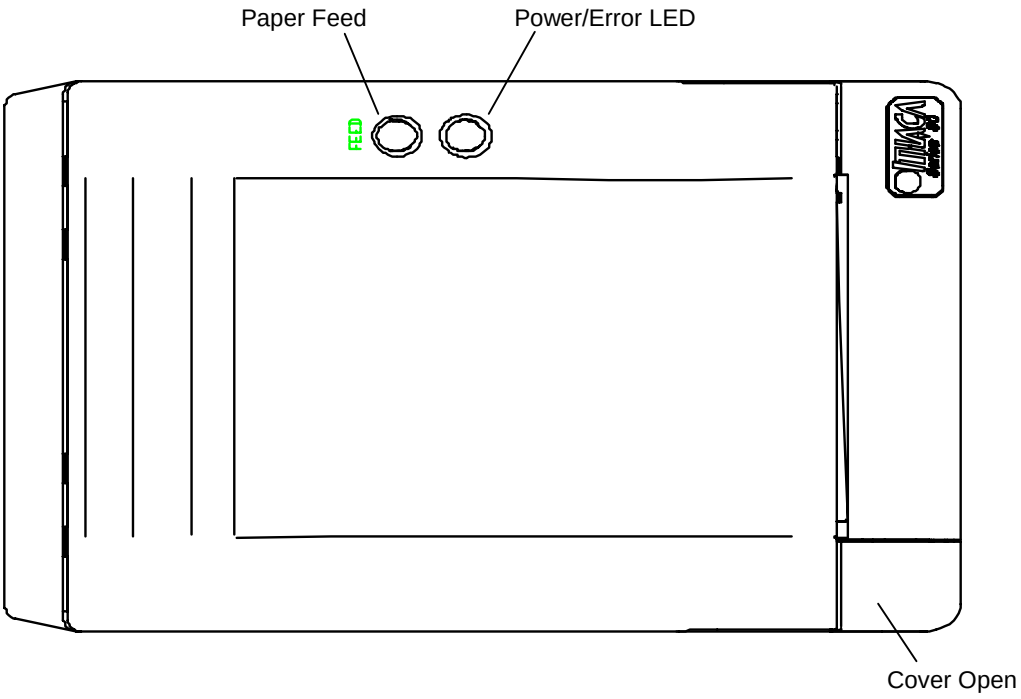
Function	**Copy user defined storage buffers**		[I]
ASCII	ESC	‘	*n*
Hexadecimal	1BH	27H	*n*
Decimal	<27>	<39>	*n*
Description	The ESC ‘ command copies data between the user defined RAM buffer and the nonvolatile EEPROM buffer. This command is not recommended for use; instead use GS - for image storage in the nonvolatile EEPROM buffer.		

Function	**Select page mode**		[E]
ASCII	ESC	L	
Hexadecimal	1BH	4CH	
Decimal	<27>	<76>	
Usage	Epson TM-8x emulation		
Description	ESC L switches from standard mode to page mode. This command is enabled only when input at the beginning of a line in standard mode; it has no effect in page mode. Standard mode is selected as the default. The following commands are not effective in page mode: ESC V, ESC a, ESC {, GS L, and GS W. If these commands are processed in page mode, an internal flag is activated.		

Function	**Select standard mode**		[E]
ASCII	ESC	S	
Hexadecimal	1BH	53H	
Decimal	<27>	<83>	
Description	ESC S switches from page mode to standard mode. This command is effective only in page mode. Data buffered in page mode is cleared. This command returns the values set by the ESC W command to the default values. The value set by the ESC T command is maintained. The printer returns to standard mode with ESC S, FF, and ESC @. This command sets the print position to the beginning of the line.		

Chapter 9:
Operator Panel Controls

Operator controls consist of one push button and one LED. The location and functionality of these controls are as follows.



Cover Open Button

The release button on the front of the OKIPOS 80 Plus III Printer that opens the cover exposes the printer's paper roll.

Paper Feed Button

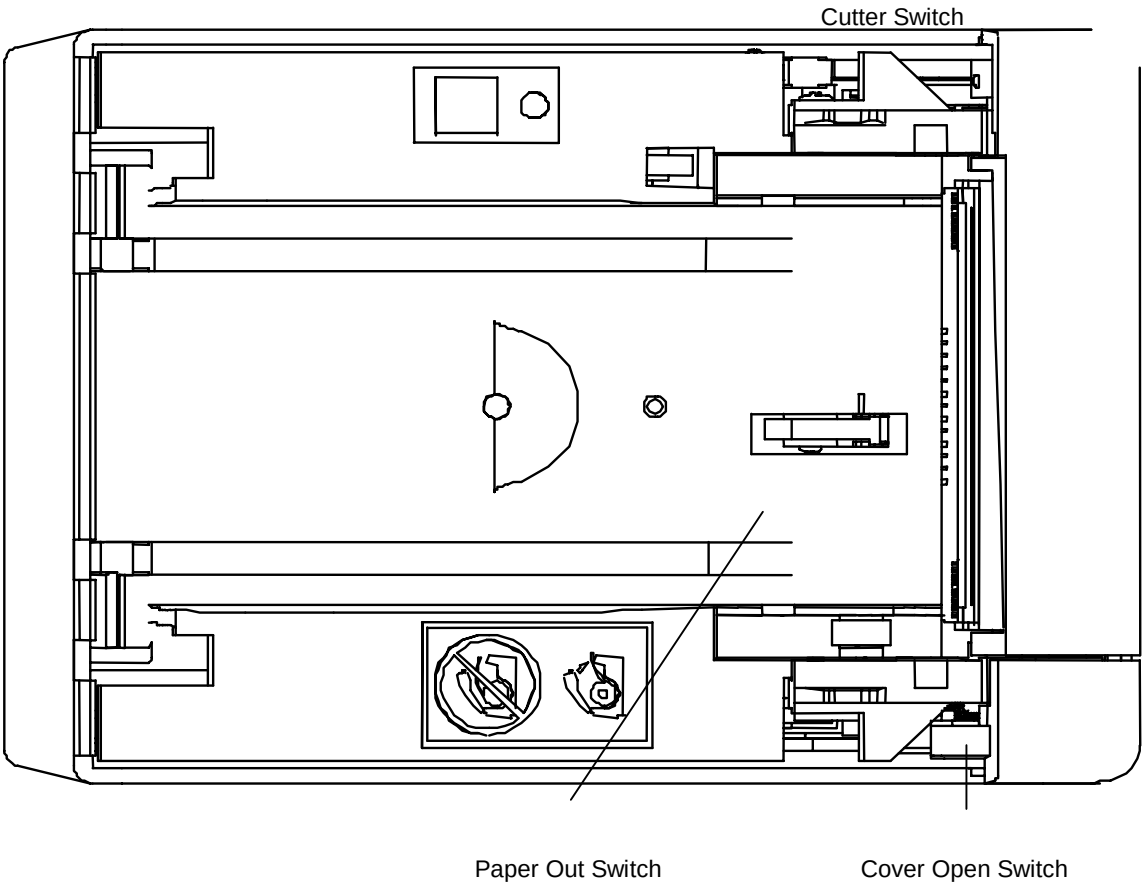
The small, circular button located on the printer top cover has several functions. Depending on the state of the printer and when the button is pressed, the functions of the line feed button are as follows. When the printer is in the normal operational state and the panel button is depressed for a short duration, the printer will feed the paper to a point exposing the last printed line to the user. Further depression of the button will result in the activation of the 5.3 inches per second slew mode in the printer until the button is released. If the button is depressed during the printer reset cycle, its operation will vary. Depending on what operating mode you wish to enter into, reference the section on Self-test or configuring the printer for more details.

Power/Error LED

The power/error LED indicates a power on state during normal operation. The LED will flash when the printer enters any error state. See Appendix B for the printer flash code definitions.

Chapter 10:
Printer State Control Switches

The OKIPOS 80 Plus III Printer controller monitors the state of the printer based on the position of several switches housed in the mechanism. The switches monitor the printer with respect to the availability of paper and the position of the cover and cutter mechanism.



Paper Out Switch

Mechanical switch used to indicate the presence of paper.

Cover Open Switch

Mechanical switch used to indicate a closed or opened cover.

Cutter Position Switch

Mechanical switch used to indicate proper homing of the cutter mechanism.

Chapter 11: Troubleshooting

Hexadecimal Dump

The hex dump feature allows experienced users to see exactly what data the printer is receiving. This can be useful in finding software problems. When you turn on the hex dump function, the printer prints all commands and other data in hexadecimal format along with a guide section to help you find specific commands.

To use the hex dump feature, follow these steps:

1. Enter the printer's remote configuration, and turn the hex dump option ON. See Chapter 4 for information on using the remote configuration.
2. Upon exiting remote configuration or subsequently powering the unit on/off, the printer will print the following: HEXADECIMAL DUMP.
3. Run any software program that sends data to the printer. The printer will print all the codes it receives in a two-column format. The first column contains the hexadecimal codes and the second column gives the ASCII characters that correspond to the codes.

   HEXADECIMAL DUMP

1B	21	00	1B	26	02	40	4	.!..&.@@
1B	25	01	1B	63	34	00	1B	.%..c4..
41	42	43	44	45	46	47	48	ABCDEFGH

   A period (.) is printed for each code that has no ASCII equivalent.

   During hex dump all commands are disabled.
4. The printer will remain in this state until the hex dump mode is turned off in the Remote Configuration.

Appendix A

Communications

Overview

In order for a receipt to be printed, a computer must be able to accept a data stream containing characters and commands that the host computer wished the printer to print. This section describes the various interfaces that allow the transmission of data.

Interfaces

In order for the printer to communicate with the host, a communication link must be set up. The Model 80PLUS supports the following two communication interfaces: RS-232C and Parallel.

Each of these has a protocol associated with it that the host must adhere to and understand. Only when the interface parameters are matched and the proper protocol is used will the host and the printer be able to communicate. See the description of the protocol associated with each type of interface listed below.

RS-232C Interface

The RS-232C interface uses the RTS/CTS, DTR/DSR, or XON/XOFF protocol. For RTS/CTS, changes in the RTS/CTS signal coordinate the information flow. For DTR/DSR, changes in the DTR/DSR signal coordinate the information flow. For XON/XOFF, data characters transmitted between the host computer control communication data flow.

The RS-232C version of the OKIPOS 80 Plus III Printer offers the standard communication options that are configured in the flash.

RTS/CTS Protocol

The RTS signal is used to control data transmission to the printer. It is driven high when the printer is ready to receive data and driven low when it cannot accept any more data. The host will transmit data to the printer when it recognizes the state of the printer's RTS signal is high.

DTR/DSR Protocol

The DTR signal is used to control data transmission to the printer. It is driven high when the printer is ready to receive data and driven low when it cannot accept any more data. The host will transmit data to the printer when it recognizes the state of the printer's DTR signal is high.

XON/XOFF Protocol

ASCII characters coordinate the information transfer between the printer and the host system. The printer sends an ASCII DC1 (11 Hex, XON) character when it is ready to receive data, and it sends an ASCII DC3 (13 Hex, XOFF) character when it cannot accept any more data. The host system must monitor the communication link in order to send data at the appropriate times.

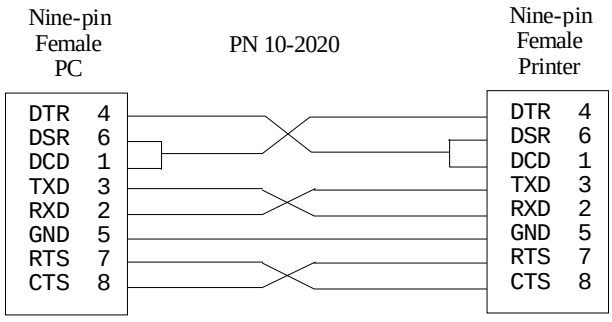
RS-232C Technical Specification

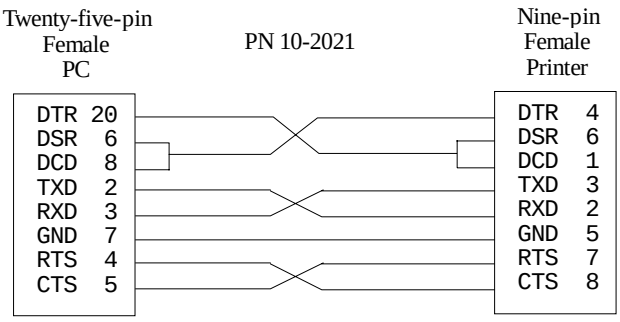
This section describes the pin settings for the connectors and the RS-232C interface parameters.

Connectors

The following illustration shows the RS-232C communication connector and pin assignments. The connector is a 9-pin male D-shell connector and is located in the hollow cavity under the printer.

Pin #	Signal Name	Signal Function	PC Host 9-pin Cross Connect Pin #
1	Received line signal detector	Not used	
2	Serial receive	Input signal to receive data from the host system	3 Tx
3	Serial transmit	Output signal sending data to the host system	2 Rx
4	Data terminal ready	Output signal to float control the host	6 DSR
5	Ground	Logic ground	5 GND
6	Data set ready	Input signal to float control the printer	4 DTR
7	Request to send	Output signal to float control the host	8 CTS
8	Clear to send	Input signal to float control the printer	7 RTS
9	Ring indicator	Not used	


Nine-pin
Female
PC
PN 10-2020
Nine-pin
Female
Printer
DTR 4
DSR 6
DCD 1
TXD 3
RXD 2
GND 5
RTS 7
CTS 8
DTR 4
DSR 6
DCD 1
TXD 3
RXD 2
GND 5
RTS 7
CTS 8


Twenty-five-pin
Female
PC
PN 10-2021
Nine-pin
Female
Printer
DTR 20
DSR 6
DCD 8
TXD 2
RXD 3
GND 7
RTS 4
CTS 5
DTR 4
DSR 6
DCD 1
TXD 3
RXD 2
GND 5
RTS 7
CTS 8

Parallel Interface

Parallel Interface Specification (IEEE 1284)

Parallel Protocol

The OKIPOS 80 Plus III Printer uses a standard PC-compatible IEEE 1284 parallel interface. The following illustration shows the timing diagram for the interface protocol in compatibility mode.

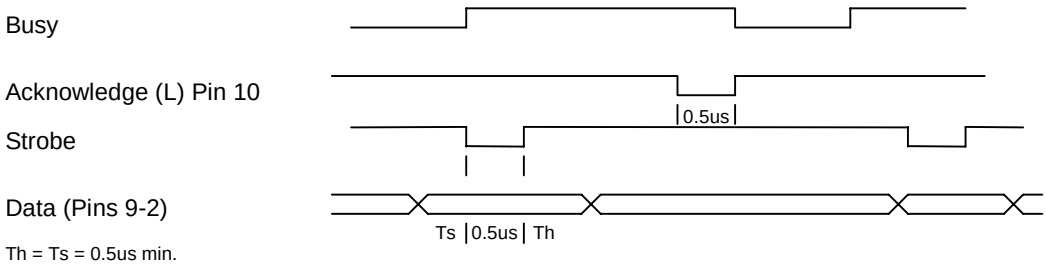


Figure 4 Timing diagram in compatibility mode

1. The host places its data on the data lines.
2. The host strobes the data into the printer latch using Strobe (L).
3. The printer goes Busy (H) until the printer is ready to receive the next byte.
4. The printer acknowledges receipt of the data byte by Pulsing ACK (L).
5. The printer removes Bush (H) to allow continuation of data flow.

NOTE: Definition and timing of the parallel IEEE 1284 interface is beyond the scope of this manual. For a complete description of this interface, refer to the IEEE 1284 Specification.

This table describes the pin settings for the parallel interface.

Pin 1	Strobe	Clock data to printer	Host to Printer
Pins 2-9	D0-D7	Data	Host to Printer
Pin 10	ACK(L)	Printer accepted data	Printer to Host
Pin 11	Busy	Printer busy	Printer to Host
Pin 12	PE	Paper out/status	Printer to Host
Pin 13	SLCT	Printer selected	Printer to Host
Pin 14	AUTOFD	Auto feed paper	Host to Printer
Pin 15	ERR(L)	Printer error	Printer to Host
Pin 16	INIT(L)	Initialize the printer	Host to Printer
Pin 17	SLIN	Select printer	Host to Printer
Pins 18-25	GND	Ground	

Appendix B

Error Code Diagnosis

Description

The OKIPOS 80 Plus III thermal printer uses a single status LED to display on-line and error conditions. The tables below describe the types of error conditions possible and the patterns that the LED will flash for those conditions.

Key to Graphical Representation:

- • = LED is ON for 0.5 second
- • = LED is ON for 0.1 second
- _ = LED is OFF for 0.5 second
- _ = LED is OFF for 0.1 second

IN ORDER OR PRECEDENCE:

Error Condition Present Description	Graphical Representation	Verbal
QSM RAM ERROR	_____•_•_•_•_•_•_•_____	7 quick flashes
RAM ERROR	_____•_•_____	2 quick flashes
EEPROM VERIFY ERROR	_____•_•_•_•_•_•_____	6 quick flashes
CHECKSUM VERIFY ERROR	___•••••___	5 quick flashes
THERMAL HEAD OVERHEAT continuous	_•_•_•_•_•_•	rapid,
CUTTER ERROR	_____•_•_•_____	3 quick flashes
COVER OPEN	_•_•_•_•_•_•_	continuous
PAPER OUT	_____••••••_____••••••_____	slow, continuous

Appendix C

ASCII Code Table

HEX	Decimal	ASCII	HEX	Decimal	ASCII	HEX	Decimal	ASCII	HEX	Decimal	ASCII
00	0	NULL	20	32	SP	40	64	@	60	96	`
01	1	SOH	21	33	!	41	65	A	61	97	a
02	2	STX	22	34	"	42	66	B	62	98	b
03	3	ETX	23	35	#	43	67	C	63	99	c
04	4	EOT	24	36	$	44	68	D	64	100	d
05	5	ENQ	25	37	%	45	69	E	65	101	e
06	6	ACK	26	38	&	46	70	F	66	102	f
07	7	BEL	27	39	'	47	71	G	67	103	g
08	8	BS	28	40	(	48	72	H	68	104	h
09	9	HT	29	42	)	49	73	I	69	105	i
0A	10	LF	2A	42	*	4A	74	J	6A	106	j
0B	11	VT	2B	43	+	4B	75	K	6B	107	k
0C	12	FF	2C	44	,	4C	76	L	6C	108	l
0D	13	CR	2D	45	-	4D	77	M	6D	109	m
0E	14	SO	2E	46	>	4E	78	N	6E	110	n
0F	15	SI	2F	47	/	4F	79	O	6F	111	o
10	16	DLE	30	48	0	50	80	P	70	112	p
11	17	DC1	31	49	1	51	81	Q	71	113	q
12	18	DC2	32	50	2	52	82	R	72	114	r
13	19	DC3	33	51	3	53	83	S	73	115	s
14	20	DC4	34	52	4	54	84	T	74	116	t
15	21	NAK	35	53	5	55	85	U	75	117	u
16	22	SYN	36	54	6	56	86	V	76	118	v
17	23	ETB	37	55	7	57	87	W	77	119	w
18	24	CAN	38	56	8	58	88	X	78	120	x
19	25	EM	39	57	9	59	89	Y	79	121	y
1A	26	SUB	3A	58	:	5A	90	Z	7A	122	z
1B	27	ESC	3B	59	;	5B	91	[	7B	123	{
1C	28	FS	3C	60	<	5C	92	\	7C	124	|
1D	29	GS	3D	61	=	5D	93	]	7D	125	}
1E	30	RS	3E	62	>	5E	94	^	7E	126	~
1F	31	US	3F	63	?	5F	95	_	7F	127	(SP)

Appendix D

Language Table - Code Page Definitions

Code Page	Country Code/ Language Set	Decimal <n_1> <n_2>	Hex <n_1> <n_2>	ASCII <n_1> <n_2><n_3>	Epson ID
64	USA (Slashed 0)	0,64	0H,040H	0,0,6,4	NA
65	USA (Unslashed 0)	0,65	0H,041H	0,0,6,5	NA
66	British	0,66	0H,042H	0,0,6,6	3
67	German	0,67	0H,043H	0,0,6,7	2
68	French	0,68	0H,044H	0,0,6,8	NA
69	Swedish I	0,69	0H,045H	0,0,6,9	5
70	Danish I	0,70	0H,046H	0,0,7,0	NA
71	Norwegian	0,71	0H,047H	0,0,7,1	NA
72	Dutch	0,72	0H,048H	0,0,7,2	14
73	Italian	0,73	0H,049H	0,0,7,3	NA
74	French Canadian	0,74	0H,04AH	0,0,7,4	13
75	Spanish I	0,75	0H,04BH	0,0,7,5	NA
76	Swedish II	0,76	0H,04CH	0,0,7,6	15
77	Swedish III	0,77	0H,04DH	0,0,7,7	16
78	Swedish IV	0,78	0H,04EH	0,0,7,8	17
79	Turkish	0,79	0H,04FH	0,0,7,9	18
80	Swiss I	0,80	0H,050H	0,0,8,0	19
81	Swiss II	0,81	0H,051H	0,0,8,1	20
90	Publisher	0,90	0H,05AH	0,0,9,0	64
91	Welsh	0,91	0H,05BH	0,0,9,1	NA
437	USA	1,181	1H,0B5H	0,4,3,7	0
774	Baltic	3,6	3H,006H	0,7,7,4	74
850	Multilingual	3,82	3H,052H	0,8,5,0	26
852	East European Latin II	3,84	3H,054H	0,8,5,2	46
855	Cyrillic I	3,87	3H,057H	0,8,5,5	44
857	Turkey	3,89	3H,059H	0,8,5,7	57
860	Portugal	3,92	3H,05CH	0,8,6,0	28
861	Icelandic	3,93	3H,05DH	0,8,6,1	73
862	Hebrew NC	3,94	3H,05EH	0,8,6,2	60
863	Canada French	3,95	3H,05FH	0,8,6,3	43
865	Norway	3,97	3H,061H	0,8,6,5	27
866	Cyrillic II	3,98	3H,062H	0,8,6,6	45
869	Greek_869	3,101	3H,065H	0,8,6,9	47
874	Thailand	3,106	3H,06AH	0,8,6,4	NA

Code Page	Country Code/ Language Set	Decimal <n_1> <n_2>	Hex <n_1> <n_2>	ASCII <n_1> <n_2><n_3>	Epson ID
895	Kamenicky (MJK)	3,127	3H,07FH	0,8,9,5	55
1008	Greek 437	3,240	3H,0F0H	1,0,0,8	38
1009	Greek 928	3,241	3H,0F1H	1,0,0,9	39
1011	Greek 437 CYPRUS	3,243	3H,0F3H	1,0,1,1	41
1012	Turkey	3,244	3H,0F4H	1,0,1,2	29
1014	Polska Mazovia	3,246	3H,0F6H	1,0,1,4	22
1015	ISO Latin 2	3,247	3H,0F7H	1,0,1,5	23
1016	Serbo Croatic I	3,248	3H,0F8H	1,0,1,6	24
1017	Serbo Croatic II	3,249	3H,0F9H	1,0,1,7	25
1018	ECMA-94	3,250	3H,0FAH	1,0,1,8	42
1019	Windows East Europe	3,251	3H,0FBH	1,0,1,9	49
1020	Windows Greek	3,252	3H,0FCH	1,0,2,1	50
1021	Latin 5 Windows Turkey	3,253	3H,0FDH	1,0,2,2	51
1022	Windows Cyrillic	3,254	3H,0FEH	1,0,2,4	52
1024	Hungarian CWI	4,0	4H,000H	1,0,2,5	54
1026	ISO Latin 4	4,2	4H,002H	1,0,2,6	56
1027	Ukrainian	4,3	4H,003H	1,0,2,7	66
1028	Roman-8	4,4	4H,004H	1,0,2,8	58
1029	ISO Latin 6	4,5	4H,005H	1,0,2,9	67
1031	Hebrew OC	4,7	4H,007H	1,0,3,0	61
1032	Windows Hebrew	4,8	4H.008H	1,0,3,2	62
1033	KBL-Lithuanian	4,9	4H,009H	1,0,3,3	63
1034	Windows Baltic	4,10	4H,00AH	1,0,3,4	68
1035	Cyrillic-Latvian	4,11	4H,00BH	1,0,3,5	69
1072	Bulgarian	4,48	4H,030H	1,0,7,2	72
NA	French				1
NA	Danish I				4
NA	Italian				6
NA	Spanish I				7
NA	Japanese				8
NA	Norwegian				9
NA	Danish II				10
NA	Spanish II				11
NA	Latin American				12

Appendix E

Upgrading/Changing Printer Firmware

The OKIPOS 80 Plus III thermal printer's firmware is stored on a nonvolatile flash memory chip. The flash chip in your printer can be reprogrammed at any time using software utilities supplied Oki. These utilities give you the ability to upgrade the capabilities of your printer when newer versions of firmware become available, as well as load customized versions of it to meet your specific needs. All the process requires is that the OKIPOS 80 Plus III Printer be connected to a host PC and the appropriate software utility then run; the entire process takes less than five minutes. Contact Oki or visit our web site for more information about obtaining updates.